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Preparation of Health Education Personnel for the War and Post-war Periods*

The Responsibility of the School of Public Health

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THE job of training personnel for work in the health education field "is not by any to be entered into unadvisedly or lightly," in the words of the *Book of Common Prayer.*

Seventy years ago Elisha Harris,[1] the first secretary of the American Public Health Association, recognized the importance of health education in his statement, "The permanent value and success of any methods or system of sanitary government will depend upon the degree in which the people are generally enlightened, concerned, and made responsible, in regard to their sanitary duties." As a laconic former president of the United States reputedly said on the birthday of a septuagenarian, "Seventy years is a long time." However, even after such a long period, in the fairly recent words of Hiscock,[2] "We must not assume that there is a well articulated 'science' of public health education. The pillars—psychological, sociological, and pedagogical—are themselves none too steady."

A suitable training program for this broad and varied field has been mapped out only with great difficulty. As in many other now well established branches of public health and the social sciences, health education in its early developmental period had to be hewn out more or less from solid rock. And this was done by a relatively small group of geniuses with the innate ability and the broad viewpoint which would have insured success in practically any field of endeavor. The time has now been reached where more or less of a mold may be set up, and a degree of mass production may to a

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degree replace the relatively slow custom-built method of development.

Five years ago the Subcommittees of the Committee on Professional Education of the A.P.H.A.[3, 4] prepared two blueprints; one for the education of school health educators, and another for adult health educators. A more recent report of the parent committee [5] includes both types of workers in a more or less common mold. This indicates the feeling that, though the application may be different, similar educational backgrounds may serve satisfactorily in both types of work. This later report, in addition to outlining certain professional qualifications desirable for health educators, concludes that a number of personal characteristics are also important. Among such traits are: creative ability, leadership, good personal health, good judgment, pleasing personal appearance, common sense, adaptability, ability to work with people, ability to size up and meet situations, and the ability to present pertinent facts simply and effectively. It is evident that the importance of health education is now fully realized if paragons such as this are to be required to do the job.

Seriously, however, the report of this committee which has done so much to improve standards for public health personnel, gives an excellent picture of the job to be done and the types of training required properly to fit an aspirant for the work. As the committee carefully points out, a major portion of this training must be completed before the future health educator enters a school of public health. The basic cultural and science background, or its practical equivalent, must be acquired in college, leaving only the completion of the educational process for the postgraduate school. Obviously one who decides upon this field at the time of entering college is in a position to get better preparation than would otherwise be the case. A candidate with preparation in psychology, education, economics, sociology, and enough of the basic sciences to acquire a full appreciation of the scientific method makes the job of the public health school relatively simple. With this sort of a beginning it is necessary only to add training in hygiene and public health, public administration, and the special skills required in health education, followed by carefully planned and supervised field experience in some suitable health agency. Probably most of us will agree with the principles outlined in the committee report. From the viewpoint of public health schools certain features of the training program require more complete discussion.

Since the proper college background is so vital, the schools of public health should make suitable contacts with vocational advisers in colleges likely to give preliminary training to future health educators. Such advisers need to become fully acquainted with the health education field and the type of training required so that the subject may be presented to students in the favorable light it merits. Students showing an interest might well be encouraged to get in touch with one or more of the schools of public health fairly early in their college courses so that they may be able to plan their work effectively. There would also be an advantage in giving the person responsible for admission to the public health school an opportunity to size up the candidate so that he can advise whether success in the health education field is likely from the personality standpoint.

Like health departments and most voluntary health agencies, public health schools do not have all the facilities and personnel they would like. This situation has a very bright side, however. It forces the public health school to go out into the surrounding community and into the faculties and laboratories of

other schools of the university with which it is associated for teaching assistance and for learning opportunities. Some public health students in the past have felt the lack of sufficient contacts with agencies actually working in the community. Doubtless no one in the health field has more work with outside agencies than the health educator, and such contacts as can be made during student days will bear rich fruit in later years. Agencies available to the public health school may vary in quality; but there will be some variation in the quality of community agencies everywhere. Medicine progresses through a knowledge of pathology as well as by a study of physiology, and a few pathological agencies thrown in for good measure will make better clinical material. How good would medical students be who had their training from the examination of only normal persons? Unquestionably the intensive period of field work, which will come after the formal training, is of the greatest importance. My argument is for beginning this sort of thing even earlier than during the period of "internship."

Some public health schools have made it an established policy to keep in close touch with their graduates, even to the point of serving as a sort of employment agency for the students, as well as for employers interested in obtaining qualified personnel suited for particular tasks. This policy has many advantages in addition to the obvious one of finding round holes for round pegs and vice versa. If the school keeps in close touch with its alumni, it can discover whether the training it is giving is the sort that proves of greatest help under actual field conditions. It may be that the proof of the pudding will be the indigestion following its ingestion; but even if this be the case, it is better to find out what went wrong and try to discover a remedy. In other words, the teaching of health education should be eminently practical. The ivory tower approach, if used at all, should be restricted to those few selected individuals who may be trained for complex research in health education problems.

If close contact with health education graduates is important for schools of public health, frequent check-up with employing agencies is possibly even more so. The employers are in a position to indicate whether or not they are getting the service desired from the health education workers in their organization. It is entirely possible that the employers do not know precisely what they ought to require. Would it not be possible and desirable for the schools of public health to assume a little more responsibility in helping to show the employing agencies what they really should have in the way of trained health educators, and what results may be expected if such people are employed? In this line of thought, Riggin[6] has suggested, as a health officer, some ways of evaluating health education work. He says, "The quality of such activities can readily be measured by the editorial acceptance of the syndicated press of news releases, by the reader reaction to the departmental publications prepared for popular consumption, by the listener appreciation of departmental broadcasts, and by response to platform presentations." Additional methods of evaluation are available and should become more widely used.

There is another approach which public health schools can use to advance health education ideas among health administrators of the country. During their formal postgraduate training the future administrators may be given a picture of the health education field. It is a fairly widespread opinion that certain public health schools put a great deal more emphasis on health

education than others. This is inevitable, due to variations in faculty backgrounds and interests. While it is desirable for some schools to do an outstanding job in certain fields, as others develop their reputation along different lines, too much specialization is undesirable.

After graduation the various types of public health professional workers are going to have to work together whether they like it or not. And coöperation on the job can begin in no better place than the school of public health. A person who has learned to work with others in related fields is going to be more useful than someone with the most refined training possible who has never learned coöperation, and who cannot see things from other viewpoints than his own.

Suppose an embryo health officer with all his medical background and hospital experience does cringe when he has to sit through seminar sessions in which the budding health educator fresh from college struggles to find expression in medical terminology. Is it not likely that such a future health officer will be more conscious thereafter of the difficulty the public has in understanding Greek and Latin names? And will not the health educator who rubs elbows with the health officer in training have a more complete knowledge of how his mind works; why he needs to think of budgets and appropriating bodies; why his interest in public reaction to some bit of health education or propaganda may be somewhat different from the interest of the health educator? Perhaps of even greater importance in the training process is the advantage to health officers who will work in jurisdictions so small as to be unable to afford specialized health education workers. Such men can get at least an idea of what the health educators are trying to do, and some conception of the methods by which the objectives are supposed to be accomplished. From this contact they may well acquire enough to be of the greatest value to them in their future work.

Public health schools should not allow prospective health educators to lose sight of the importance of private practitioners of medicine and dentistry in any community educational program. To his patients, the opinion of the physician is vitally important. He can either assist in the community program or can do much to discredit it if he has the feeling that it is ill-conceived, or even if he does not understand it. Mary Connolly [7] has said:

> There probably is no better investment of health education funds to be found than that intelligently planned to keep physicians informed. The personnel of the organization is expanded a hundredfold by each physician who recognizes his part in the field—if we are to elicit the interest of physicians, we must keep them informed as to the problems of the community; we must ask their advice in solving these problems.

Riggin [6] has also pointed out the important place which organized medicine plays in the health education program.

> As a means of increasing the usefulness of the specialist in health education perhaps a closer coöperation with the state medical society could be developed. This organization can be one of the most powerful educational influences in a state.

During their postgraduate training health educators can be given some contact with the local and perhaps the state medical society. Even attendance at meetings will give an idea of the problems of organized medicine and some of the attitudes to be found among its members. This is a force with which to reckon, even though the educator might not agree with all of the opinions expressed. It would not be impossible for the school of public health to coöperate with the local medical society in some program of community education, using students to

assist in preparing material for speakers; possibly in working up topics for newspaper articles and radio addresses, and in various other ways. Such a coöperative arrangement would offer difficulties, but might have very useful consequences. Whatever method the school may determine upon as best adapted to give the student at the point of view of the private practitioner, the objective is worthy of considerable effort. The medical associations are doing a great deal of valuable work in health education, and this is one field in which there is likely to be little argument about the encroachment of health agencies into the field of private practice.

It is a bit difficult to say why a health officer is called upon to present the point of view of the schools of public health in this training problem. Possibly he may be compared to a baseball catcher who, standing behind the plate on the receiving end and close enough to the batter to observe him minutely, is allowed to signal the pitcher what kind of a ball to throw. Doubtless, it is helpful for the schools to get ideas from the field so that they may know the needs more completely, and therefore be in a better position to adjust their training programs to meet such needs as may be found to exist.

It is evident that the war has an effect on the training of health educators. The work they are to do upon graduation is more needed than ever before. Some details of the educational technic will need revision in accordance with the prevailing psychology of the public. The training period will perhaps require acceleration. Just as in securing candidates for schools of nursing, it is probable that some financial inducements may be needed to lure prospective students from the immediate appeal of high paid defense jobs. But fundamentally the needs are little different from those of peacetime. It is fortunate that thinking is crystallizing so that the master design will not have to be changed radically, and the training process may proceed apace.

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The Preparation of Health Education Personnel for the War and Post-war Periods*

Supervised Field Work

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COLLEGES and universities throughout the country have accelerated and modified their educational programs to meet the ever increasing demands of the war and post-war periods. Health education is one of the fields in which the need for intensified training has been felt and in which many changes are taking place.

Supervised field work is not new to many professions. For years the doctor, the nurse, the sanitarian, and the social worker have had "internships" included in their training. But only recently has need for such training been felt in the field of public health education. Some students [1, 2] who were working on special thesis problems have had an opportunity to serve as "interns," but until this year no school of public health required field training for all health education majors.

In a recently published report on the Educational Qualifications of Health Educators [3] it is stated that "carefully planned and supervised field experience and 'internship' should be regarded as an important element in the training of the health educator and in the development of skill and ability in the field of health education." The same report also mentions the place for graduate training and recommends "that programs of professional study in health education be offered in those institutions which are providing professional education in other fields of public health, and which have available the required instructional facilities. Field training stations are desirable."

Thus field work has been officially recognized as an essential part of the health educator's training, but to date so little has been done along this line that it was felt that a description of an actual program would be worth while.

The field training program for public health educators which I shall describe here is part of a health education program that began in September, 1941, when the U. S. Public Health Service, in coöperation with the North Carolina State Board of Health and the Cumberland County Health Department, inaugurated the first of a series of demonstrations in community health education in extra-cantonment zones.[4] Since that time, similar programs have developed in seven war counties in North Carolina, in one in South Carolina, and

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in one in Oklahoma, and at the present time plans are under way for beginning them in many other states.

Health education consultants were loaned by the U. S. Public Health Service to the states mentioned to assist with the development of these programs.

These demonstrations created such an interest in community health education that there was an immediate demand for qualified health educators to develop similar programs in other areas. The demand for such personnel so far outnumbered the supply that several states decided to train their own workers. Provision was made for this training through Social Security funds, and qualified educators were recruited and sent to schools of public health for graduate training in public health education.

In addition to the state fellowships offered, the W. K. Kellogg Foundation made available funds to the U. S. Public Health Service in January, 1943, for training twenty health educators.[5] The School of Public Health of the University of North Carolina was selected as the first training center because the counties in which the community health education demonstrations were being carried on were available as field training centers for health educators from this school.

The curriculum for majors in public health education at the University of North Carolina includes three-quarters of academic work and one-quarter of supervised field work or "internship." Formal courses in public health included in this field of study are: public health administration, epidemiology, vital statistics, sanitation, industrial hygiene, nutrition, venereal diseases and their control, tuberculosis control, bacteriology, parasitology, public health education, problems in public health education, school health education, and mental hygiene. In addition to these strictly public health courses other courses required for majors in public health education are: social science, education, and public speaking. Students may also audit any course in the university that they think may be beneficial to them.

In setting up the curriculum for health educators an effort was made to provide a course of study that would give the educator a thorough understanding of the field of public health and at the same time train her to perform the functions of the health educator. (The best statement of these functions was recently set up by the Committee on Professional Education of the American Public Health Association.[3])

Before the students go into the field they are given special preparation for their field training in a three-quarter problems course in health education. In this course the students work in groups and are asked to find solutions to many of the practical problems that they will meet in the field. Perhaps more important than the actual solution of the problems themselves is the fact that members of the group learn to work together and learn the methods and technics that they must later use with community groups.

The field training program for the first twenty-seven health education majors at the University of North Carolina began in June, 1943, when these students attended an "Institute for Tuberculosis Workers" arranged and conducted by the National Tuberculosis Association and the North Carolina State Tuberculosis Association for the secretaries of local tuberculosis organizations in the state. This institute was held at the headquarters of the North Carolina State Board of Health at Raleigh.

Participation in this institute gave the health education students an intimate knowledge of the objectives and operating program of a voluntary

agency on the national, state, and local level. While in Raleigh the students also visited the offices and laboratories of the State Board of Health and were given an opportunity to learn at first hand about the program and activities of the various divisions of this official state health agency.

From Raleigh each student proceeded to the field training center to which she was assigned. These centers are located in Cumberland, New Hanover, Craven, Carteret, Wayne, Lenoir, and Richmond Counties in North Carolina; in Spartanburg County, South Carolina; and in Pottawatomie County, Oklahoma. From one to four students were assigned to each center, the number depending upon the size of the community, the stage of development of the existing health education program, and the opportunity that the community offered for the student to get the greatest amount of experience in community organization.

The counties where the training centers are located are war counties that are faced with all of the problems that have arisen in such areas—concentrated populations, housing shortages, inadequate nutrition, overcrowded and insanitary eating establishments, prostitution, juvenile delinquency, shortage of nursing, medical, and teaching personnel, industrial hazards, and all of the other problems that have been mentioned many times during this meeting.

In the field training center a two weeks' orientation period was planned for the students by the Health Education Consultant on the staff of the local health department. During this time each student was given an opportunity to meet the entire staff of the health department and to observe their activities. Arrangements were also made for students to meet the heads of all of the agencies in the community that made any contribution to the total health program and to discuss with these leaders the objectives and operation of their programs. After this orientation period the student officially assumed the responsibility of a health educator, with a special assignment for the weeks that remained in this phase of her field training program.

Excerpts from student reports illustrate the type of work carried on in the assigned areas. One student gives the following outline:

Orientation—During the first month we spent a greater portion of our time getting oriented to the health department. We read the daily reports of the health educator, the appraisal form for the county health department, and available materials on state and local statistics and activities. We also made many contacts with local people in connection with organization work.

Organization and Committee Activity—The following aspects of the Executive Committee of the Community Health Education Program were developed. The trainees attended two regular committee meetings and one subcommittee meeting.

1. A review of the committee organization.
2. Introduction to committee members.
3. Report of the library committee on selection of books for school and public library. The books cover topics of venereal disease, social hygiene, and juvenile delinquency. Two hundred dollars has been allotted by the school board and health department for the purchase of the books.
4. Announcement of offer to the committee for radio time by the county medical society.
5. Discussion on garbage disposal in the city.
6. Committee discussed plans for organization work to be done by student trainees from the University of North Carolina.
7. Suggestions for radio programs to be presented by the student trainees were discussed.
8. At the second meeting a report of the radio topics was made.
9. A meeting date for the health council being formed was arranged.

Subcommittee Meeting—

1. Made selection of clubs and organizations which would be invited to have a representative on the Health Council.
2. Suggested that trainees open organization work in one of the school areas.

Organization Among the Colored—

1. The trainees were introduced to the com-

mittee of the Community Health and Defense League and heard a review of their organization and the aims and objectives they had set up.

2. The block leaders were appointed and began their first work by collecting money for the recreation drive. With a goal of $100 set, $63.86 was collected and turned in to the Chamber of Commerce and a recreation area was opened in the colored section.

3. Plans were made for a clean-up campaign when the subject of sanitation was selected for study by the executive committee. The campaign opened with an educational week with district meetings, film showings, and discussions by members of the executive committee and health department personnel.

4. The first home nursing class among the colored was started with 22 enrolled. The interest was stimulated through the activities of the executive committee.

5. Continued making contacts during this period and discussing the recreation drive and plans for the campaign with block and district leaders.

Recreation Program—

1. Interviewed the chairman and three other members of the park and auditorium committee of the recreation council. Wrote and presented a broadcast on the program.

2. Toured the parks with the supervisor and made plans for an in-service training program for the park supervisors. The supervisor offered $10 for supplies.

Materials, Publicity, etc.—

1. Prepared notices for colored churches and wrote two news articles on meetings attended.

2. Learned to run a selectro-slide machine and a Bell and Howell machine and reviewed films from the State Department.

State Department Visit—

1. Visited the bureaus of the State Health Department. Checked out films and books from the department. Had conferences with the State Health Officer and with the Director of the Division of County Health Work.

Another student puts into her description what the program meant to her.

Two months in this county—what does it all add up to? Statistically it adds up to 30 meetings of various kinds, 128 pounds of rat poison, a TB exhibit, etc.; but these are the tangible results which are easily totalled in a statistical report.

What of the things that can't be found in columns of figures—things like the worried look on a little colored boy's face when he asks whether he should have a Wassermann every week—things like the feeling you get riding home through miles of big pine trees under millions of stars, after swatting mosquitoes for an hour and showing VD films to 100 darkies, fresh from the potato fields! Somehow, these are the things that make it all amount to something worth while, and not just another job done!

Coming from an industrial city and a rather sophisticated atmosphere, I really didn't think I'd like living and working in a small, rural community—of course I could do it, but I did expect to be a little bored! To my amazement, I found I just loved every minute of it, and had a wonderful time along with it all. True, many of the people are backward and slow to accept new ideas, and, being a Yankee, I wanted to put a firecracker under them, but those who are convinced that a thing is good are so coöperative and really go out of their way to be helpful.

Working in a small health department was a grand experience, for it was easy to see what each person's job was and how it fitted into the whole health program. We were especially fortunate to be in a department that really coöperated, and with a health officer who was progressive and public health minded.

The biggest revelation to me, however, was seeing the real poverty of the South and the crying need for public health work. Many of the groups with which we worked were very appreciative, but I think I got the greatest personal satisfaction from the colored meetings. There is an earnestness and sincerity about them—even the primitive farm group at the river—when they are trying to learn something, that is touching. One couldn't sit there in the old colored church and watch the darkies file in after a long day's work in the fields, in some of the most outlandish outfits, and realize that people had come to learn something, and that it was up to you to give it to them without feeling part of some larger movement—something much bigger than just social service or health education. Guess it was just that feeling of what democracy is really all about—the more fortunate sharing with the less fortunate for the common good.

Somehow, out of it all, I got the feeling that for the first time I was really pulling my own weight in the world and doing something that was worth while that I could look back on with satisfaction in years to come. And I'm not ashamed to admit that I felt really touched when at our last colored church

meeting the minister said "God bless the health officer and the health educators!"

After an 8 weeks' training period in a community, the students were sent to the headquarters of the American Medical Association in Chicago, where they were given a week's orientation course on the health education program of the American Medical Association and on some special types of health education carried on by other agencies. The topics covered in this phase of the field training are as follows:

General Description of Purpose and Activities of American Medical Association
Health Education in Industry
The Radio Industry and Health Education
Health Education by Radio with a Tour of the NBC Studios
Press Relations and Medical News
The Bureau of Investigation and Its Work
Food and Drug Laws
Editing the Health Magazine
Who Gets Hygeia and Why
Dependable Health Advertising
Reprints
Organization in Health Education
Answering Health Questions by Letter
Traveling Exhibits
Scientific Exhibits
Health Meetings and Speakers
Motion Pictures

Because visual aids are important tools for carrying out any health education program and the health educator must know how to prepare, use, and evaluate them, arrangements were made for the students to receive some intensive instruction in exhibit making at the Cleveland Health Museum.

While this phase of the program concluded the summer field training for the health education majors, they will not actually complete their course until they have participated in an orientation course which will be given late in December at the National Institute of Health and the headquarters of the U. S. Public Health Service.

From the results of this supervised field work, those most closely concerned with it believe that field training should give the students: (1) an appreciation and understanding of the contributions which many agencies and organizations can make to the total community welfare and to the total education program; (2) an accurate understanding of the ways in which these groups function and of how they have worked out their relationships to each other; (3) flexibility in thinking about problems to be solved so that when one way does not work others may be tried; (4) an understanding of how to make a program of work that gives time and emphasis to projects in proportion to their real importance; (5) a sense of the importance of timing in a program of community organization; (6) supervised experience in working with people so that special abilities are recognized and weaknesses overcome whenever possible.

From the point of view of the supervisor, field training is important to her because it enables her to find out what the student can actually do on the job and what sort of a person she really is. In other words. Is she sensitive to other people's feelings? Does she see her place in relation to the rest of the staff, to the program in which she is working, to the community, and to the chief?

How well does she stand up under pressure? Is she ingenious in a difficult situation? How well can she apply what she knows about health education? How well can she organize her own personal program of living? Can she get an over-all view of a situation, or does she tend to get lost in details? What are her outstanding personality patterns?

In supervised field training, therefore, both student and supervisor gain these understandings and insight best in a situation where the student has, (1) a real assignment for which she has actual responsibility; (2) a staff position (with a name and title) which gives her

definite status in the community; (3) freedom to think for herself, find and utilize resources, carry out her ideas, and evaluate the results of her efforts; (4) local supervision that helps her to make the best possible use of the training experience and at the same time give the best service of which she is capable to the coöperating community.

It is noteworthy that such field work as has just been described will become a part of the health education curriculum in two other schools of public health beginning this fall. With this increased interest in the training of public health educators it is expected that a much larger well trained health education personnel will soon be available to assist with public health programs for the war and post-war periods.

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Cleveland Health Museum Receives Substantial Endowment

The Cleveland Health Museum, Cleveland, Ohio, has become the recipient of trust funds established by Elisabeth Severance Prentiss in 1939. The Museum shares with several other institutions in the distribution of about eight million dollars, of which 5 per cent is set aside for the Cleveland Health Museum. According to the announcement, this is believed to be the largest sum ever set aside by an individual for purposes of health education. It is expected that the income from these funds will provide in perpetuity about one-third of the present annual expense of the museum, which represents the amount of the former annual contributions of the late Mrs. Prentiss. The Museum has received a gift of the residence occupied by Mrs. Prentiss for a Museum site. Through a provision in the will, the Prentiss Foundation is able to receive contributions of others who may wish to support the Museum. Bruno Gebhard, M.D., is the Director of the Museum.

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Preparation of the Public School Teacher

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THE preparation of the public school teacher for health education has long been recognized as important. As far back as 1839, Caroline Beecher of Hartford Female Seminary wrote in an essay on The Profession of a Woman:

> What is the profession of a woman? Is it not to form immortal minds, and to watch, to nurse, and to rear the bodily system, so fearfully and wonderfully made, and upon the order and regulation of which, the health and well-being of the mind so greatly depends?—Have you been taught anything of the structure, the nature and the laws of the body, which you inhabit? Were you ever taught to understand the operation of diet, air, exercise and modes of dress upon the human frame? Have the causes which are continually operating to prevent good health, and the modes by which it might be perfected and preserved, ever been made the subject of any instruction?

Two major wars have been fought since Miss Beecher's day, wars in which many lives were needlessly lost through sickness and disease. Today, in the throes of the worst conflict the world has ever seen, we turn to the teacher for his share of help in community-wide efforts to provide the nation with man power physically and mentally capable of carrying on effectively in the armed forces, and in industry, agriculture, and community services. The brunt of the load in the immediate emergency will necessarily fall on teachers at the secondary level whose students are a most important source of wartime man power. It would be shortsighted, however, not to recognize the indispensable rôle the elementary teacher must play in laying the foundations of good health in the on-coming generation. Moreover, it is safe to say that in the present and post-war periods, both elementary and secondary teachers will participate more actively in efforts for general community health improvement, not only as an essential part of their primary task as teachers of children, but also because of the growing recognition of their potential value as lay leaders in health education. Sound preparation is essential if they are to perform these important responsibilities effectively.

In recent years much encouraging progress has been made in the field of teacher education in health. Significant developments have taken place, many under the leadership of members of this group, with the result that the general level of both pre-service and in-service training has been appreciably raised.

* Presented before the Public Health Education Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 14, 1943.

Despite the progress made throughout the country as a whole, teachers and school administrators remain inadequately prepared for participation in school and community programs. This has been shown clearly in such reports as Dr. Earl E. Kleinschmidt's recent study[1] in which is summarized the status of representative health instruction programs in twenty institutions in various parts of the United States.

In the teaching profession as in public health, the war has intensified many personnel problems. According to data assembled by Dr. Benjamin W. Frazier of the U. S. Office of Education, teacher turnover has doubled since our country entered the war. Many married ex-teachers and older teachers, long out of service, are returning to replace teachers who have entered the armed services or turned to more remunerative jobs in war industry. Contrary to popular opinion, the greatest number of actual vacancies are in junior and senior high school grades. "During the past two years," according to Dr. Frazier, "there has been a decrease of one-third in the enrollments of students in the teachers colleges and normal schools, and almost as large a decrease in the schools of education in the universities." There is, moreover, "a growing lack of interest in teaching on the part of students."[2] These facts force us to approach the whole problem of teacher preparation critically in an effort to seek methods which are applicable under wartime conditions. We need teachers able and willing to do the job now, and we must find ways of giving them the essential preparation. This is particularly true in the secondary field where teachers are least prepared and the health problems are especially acute. Because of the urgency of the secondary problem, this discussion will be limited to an exploration of what seem to be practical and expedient approaches to the health education preparation of secondary school teachers in the present war period.

Preparation of teachers, as of other personnel, should be based on the job to be done. As previously indicated, in wartime the first job of the secondary field is to "make the greatest number of pupils physically (and mentally) fit to carry on as members of the armed forces or as efficient workers." At the same time it should prepare students to be intelligent citizens, ready and capable to work for their own and their community's health improvement. This will require both health guidance of individual students and group instruction.

A Committee on Wartime Health Education for High Schools, appointed by the U. S. Commissioner of Education and composed of representatives from the Army, the Navy, the Public Health Service, the Children's Bureau, the Office of Education, and representatives from the field has attempted to define the job more precisely in a recently published health education manual for high schools.[3] This committee saw the task as student education in regard to correction of impairments, prevention and control of disease, better nutrition, accident prevention and emergency care, daily program planning for effective living, and sound mental attitudes. In addition, it saw it as one of giving students special health preparation for meeting intelligently and sanely the health and safety hazards or problems associated with military, production and community services.

It was the committee's belief that direct health teaching is essential as well as health instruction in connection with other school activities and subject matter fields. Moreover, health education in the school must be identified closely with other phases of the community health program if it is to be effective. This is a job which requires

a leader within the school well qualified in the field of health, and contributions from all members of the school staff, as well as from health departments, medical groups, parents, and others in the community.

Teacher education for health in the secondary school, therefore, means education of (1) teachers or other school personnel who will be capable of taking health education leadership and doing health teaching; (2) administrators who can intelligently shoulder the responsibility of putting a health program into action, and (3) all other school personnel who can make a contribution to the total program, as teachers of physical education, science, home economics, and social studies.

In the present emergency, this education cannot depend entirely on either the longer procedure of preservice training or in-service training through the usual pattern of summer courses and graduate study. Even if it would, the teachers who could benefit most by further study are likely not to seek it unless some stimulation is given or special financial provision is made. Even with such assistance at hand, reports from the field indicate that suitable recipients for aid in advanced study are increasingly hard to find in this war period. The situation, then, it seems to me, indicates that in addition to usual preparation methods, in-service training programs for teachers on the job should be developed more extensively—programs which will reach first of all the key teachers of the school who are the best qualified to prepare for greater leadership and for health teaching responsibilities, and then as many others as possible. It also involves the utilization of every possible channel to arouse interest and support of administrators. Fortunately, there are many teachers and administrators who already have fine preparation and are doing excellent work in health education. It is for the great majority of unprepared teachers that these suggestions are primarily designed.

In the spring of 1943, as a result of demands from the field, a second committee was called together by the U. S. Commissioner of Education to study the problem of the health preparation of school personnel, particularly in the secondary field. Membership on this committee was named by leading professional associations in education and health. The following methods of in-service training were proposed and developed in detail by the committee in its report [4]:

1. Staff or group conferences for discussion of health problems of students and community.
2. Study of health conditions or health education programs. Some problems suitable for study are:
   a. Environmental factors
   b. School lunch problems
   c. Evaluation of health education
   d. Curriculum study
   e. Surveys
3. Reading and reference materials
4. Discussion and study groups
5. Local or regional workshops
6. Participation in various health activities, as in the health education activities of the school and community or through observation and field work.

These methods are suggestive only. Their chief merit lies in the fact that they were determined jointly by leaders in education and health and are based on practical procedures which already have proved effective through field experience. In the last analysis, the responsibility for sound teacher education rests in the states and local communities themselves, and it is hoped that no opportunity will be lost during the coming months to exert such responsibility.

The simplest approach to the in-service preparation of teachers is through a planned program in a single school. This program might be initi-

ated in any one of several ways. Perhaps one teacher, or more than one, has shown an interest in health and is seeking further help or a chance to be of greater service. The principal, the nurse working in the school, or some other member of a health staff may discover this interest and give assistance in the form of literature, professional advice, or opportunity for participation under supervision in some school or community health project. Even the busiest administrator or health worker should be able to find time to open up new opportunities for these teachers. Many helpful ideas in this connection are contained in the committee report on teacher preparation to which reference has just been made. This is a natural approach but its potentialities are often missed because it is commonplace and unspectacular. Interest of a few teachers may spread to others and give the principal encouragement to plan for a more extensive in-service training program.

A second, and more organized procedure for a single school would be for the principal to hold staff or group conferences for a discussion of school or community health problems and for the formulation of plans to meet these problems. A point of departure for such discussions, as the committee suggests, might be the ideas contained in the manual *Physical Fitness through Health Education*, or it might be some particularly urgent school or community health need which has aroused the concern of teachers. A third way may be through the formation of a health committee to deal in a more organized manner with special school health problems. This single school approach is especially suitable in an area where a modest start is desirable to demonstrate what can be done in health education, or where there is no full-time health educator to help plan a more comprehensive program.

Regional, county, and city-wide training programs, aided further by state supervision and state or federal support will be needed on an extensive scale if the important wartime health needs of students are to be met. As suggested previously, an attempt might first be made to bring together in natural working units the teachers who have been selected in each school to take leadership in health education. This plan has been tried in a number of places and is being contemplated in at least one large New England city in connection with a community-wide health education program. A few years ago in Cattaraugus County, N. Y., for example, delegated teachers from four experimental high schools met three or four times a year, and during the remainder of the time functioned as separate school committees. The larger group was organized originally to work out plans for the improvement of health education in the county. Among the activities it carried out which were especially educational for the members of the group were: preparation and use of survey forms for the study of pupil, school and community health needs; making and carrying out of plans to improve conditions found by these surveys; consultations as a group with members of the local health department; and study of health services available in the county. Teachers who had had previous preparation and were already well qualified in health education became the natural leaders of their respective school groups.

Appropriate problems for similar groups to consider now are: the part education can play in meeting health needs of students engaged in war work; providing pre-induction health training for young men and women soon to enter military services; and helping solve community health problems accentuated by the war. For example, if such a group found that students are needed

for the care of young children, for assistance in clinics, or for some other community service, the group might work out plans to give students the essential health preparation, and assemble materials needed in such a program. This would require extensive reading, consultation with professional health personnel, or other preparation which could become a worth while educational experience for the teachers.

A slightly different and more organized approach would be to have school health personnel, local health departments, or other community health groups offer their facilities and personnel for short courses to be given during the year in out-of-school hours with perhaps a certificate granted to show satisfactory completion of the work.

Possibilities for more comprehensive study and service programs as through extension, correspondence, and field courses, or in workshops and institutes should be fully explored with nearby teachers colleges and universities, and with state departments of education and health. Experience which others have had with these different training methods should be utilized. It is impossible at this time to describe the many pioneering programs which have been attempted. A brief mention can be given to only a few which seem to have special implications in wartime, namely, the community workshops conducted by the University of Michigan [5] and the University of Kentucky in local communities to serve primarily the local teachers; the short institutes for teachers or administrators held under the sponsorship of such groups as Massachusetts Institute of Technology,[6] New England Health Education Association,[6] Teachers College, Columbia University, and the Center for Continuation Study at the University of Minnesota; the extension and summer courses supported by the state departments of education and health and the universities or teachers colleges in Tennessee, Michigan, North Carolina,[7] and Oregon; and the special institute and field service program in malaria education conducted by the U. S. Public Health Service.

The growing tendency of teacher preparation institutions to serve as centers for the guidance of educational programs in their respective localities has significance in respect to the problem at hand. What is needed now is further experimentation under state and federal leadership in the development of coöperative plans between these institutions and local departments of education and health.

Well qualified teachers who have had the benefits of further preparation may be used for wider service than in their own schools alone. In Cullman County, Ala., for example, a high school science teacher who had received advanced education in health, and had helped in the development of an excellent health program in his own school, was recruited by the county superintendent and county health officer as a part-time health education consultant for the other high schools in the county. In Tennessee, selected teachers who have received scholarships from the State Department of Health for summer study in health education at the university, have returned to their local communities and have made outstanding contributions not only to health improvement within their own schools but in the community at large. Some have been instrumental in securing new health units for their counties. A few have been appointed as full-time health educators in county and city systems.

Little has been said here about the preparation of school administrators for their responsibilities in health education. Concerning the importance of this, Dr. C.-E. A. Winslow has stated, "The inclusion of a comprehension of the significance of the school health program in the preparation of school

administrators is a major need. As long as such comprehension is lacking, the program will inevitably fail to reach its goal."[8] If administrators now in service are given a chance to help in the development and extension of community-wide health education programs during this war period, they will grow, I believe, in their ability to put more effective programs into action.

There is every indication that the need for teacher preparation in health education will not have diminished in the post-war period. New and even more complex problems are likely to develop which may require different training procedures. Experience gained now through the application of the principle of building a teacher education program around the job to be done under existing conditions should prove of value in the future.

Pre-service and in-service education of teachers and administrators may be expected to expand rapidly in the post-war period. Teachers colleges and universities, in coöperation with local school systems and health departments, should begin now to plan for more dynamic institutional and field programs for the health preparation of teachers.

Professional community health educators will be in greater demand if the impetus now being given by the U. S. Public Health Service and other groups continues. Well prepared teachers who have shown their ability in school and community leadership may become important recruits as such workers in the future.

Adequate health preparation of the public school teacher will bring rich dividends to the school and community. Public health has a vital part to play in this preparation.

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Multiple Antigens for Active Immunization*

IN response to numerous requests, a Sub-Group on Multiple Antigens has been appointed under the Subcommittee on Evaluation of Administrative Practices, Dr. Haven Emerson, *Chairman*. The report is published herewith at the request of the committee.

Among the possible modifications in specific active immunization procedures which may contribute to administrative economy and efficiency, without loss of benefit to the individual to be protected, is the use of multiple or combined antigens. Military experience and a number of controlled field tests have in the past few years pointed the way to changes in civil health practice which may have merit, for application by the private physician and in the routine protection of child and adult groups in the community under the auspices of local or state health departments.

The Committee on Multiple Antigens was appointed to consider the present state of scientific knowledge and practical experience in this matter and to encourage or undertake such field tests as it might think desirable.

The following report, the result of the committee's deliberations since its organization, is approved by the Subcommittee on Evaluation of Administrative Practices, and by the Committee on Administrative Practice, and is offered as a statement of fact and opinion to serve as a basis of policy for health officers:

1. In the present state of our knowledge, there is no urgent necessity for undertaking, as a wartime measure, an immediate special study of the reactions to the use of combined antigens among children or adults. Added information will become available during routine use of combined antigens. The immunizing effectiveness of such combinations of antigens as are considered desirable for routine use on the basis of practicability, already is supported by a considerable amount of data.

2. The optimal age for initial immunization, the optimal intervals between injections, and the optimal intervals before the renewal of immunization for the different antigens are variable and are important factors in the choice of possible combinations.

3. Combinations which are immunologically feasible should not be selected or recommended unless there exist justifiable reasons for establishing immunity with each antigen represented. Reasons considered justifiable are exposures which are apt to occur in normal civilian life, exposure due to occupation, or exposure due to special social conditions (for example, inmates of an institution).

4. In order to avoid confusion to those immunized, to parents, to clinicians, and to administrative officers, the combinations of antigens made available for use should be uniform in so far as practicable.

5. The influence of combining antigens on the potency of each component must be established prior to their use. Combinations which cause destruction or marked deterioration of an antigen are not considered suitable. The amount of

* Report of the Study Committee on Multiple Antigens, Subcommittee on Evaluation of Administrative Practices, Committee on Administrative Practice, A.P.H.A.

each antigen administered when given in combination must not be less than that required when administered singly.

6. Present experience indicates that non-living antigens combined with alum are better immunizing agents than non-living antigens suspended or dissolved in plain diluents. The proper spacing of the individual immunizing injections is of great importance in developing maximum immunity, as is also the route of the injection.

7. Information is at present sufficiently definite and convincing to justify the statement that immunization against scarlet fever as a routine or community-wide practice under official auspices is inadvisable until a more suitable antigen becomes available.

8. On the basis of the above impressions, the use of pertussis vaccine and diphtheria and tetanus toxoids, either singly or in combination, is considered acceptable prophylactic practice for the immunization of children in normal civilian life, except a pertussis-tetanus combination. There are other antigens, as for example smallpox vaccine, which must always be administered singly. Antigens intended to provide protection against special hazards may be administered singly or in combination, dependent upon the need.

9. Our present knowledge of immunization procedures through active immunization warrants the following recommendations:

a. *Diphtheria*—Administration of the prescribed dosage of plain or alum precipitated toxoid without preliminary Schick test, preferably not later than 6–12 months of age; otherwise as soon thereafter within the preschool age as possible. Repeat or booster dose on school entrance, sooner when indicated. Immunization of younger school children without the use of the Schick test is indicated if toxoid has not been given during preschool life. Immunization of older Schick-positive children or adults when indicated. Special consideration of pseudo-reactors advisable after 9 years of age. Reactions to injections in younger children and persons not pseudo-positive are negligible. Pseudo-reactors should receive immunizing dose divided into several small injections.

b. *Pertussis* — Administration of the prescribed dosage of plain or alum precipitated vaccine at 6–12 months of age. Administration in later preschool ages, or over, less significant as a community practice under official auspices. Value of repeat or booster dose on school entrance not adequately established, though such dose at younger ages advisable. Approved strength of vaccine, 10 to 15 billion organisms per 1 ml., either plain or alum precipitated.

c. *Tetanus*—Administration of plain or alum precipitated tetanus toxoid by itself in the preschool group as a routine practice is not recommended. In combination with diphtheria toxoid, its use is approved in this age group. The administration of tetanus toxoid at any age is recommended, provided the environmental (social or occupational) conditions demand immunity. Experience is as yet not adequate to recommend the time of giving the repeat dose. The indications are that a booster dose in one year with a repeat booster dose at time of injury, provided injury is not more than 5 years after booster dose, will provide adequate immunity so that antitoxin need not be used prophylactically. Reactions to injections at all ages negligible with few exceptions.

d. *Smallpox* — Inoculation before 3 months of age or as soon thereafter

as practicable. Repeat on school entrance and at 5 year intervals as far as practicable. Revaccination upon exposure to active case essential under all circumstances.

e. *Other Antigens of Recognized Value*—Recommended whenever special circumstances demand such immunity.

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State and Provincial Health Authorities Endorse Local Health Unit Plan

At the 59th Annual Meeting of the Conference of State and Provincial Health Authorities of North America held on March 22 in Washington, D. C., under the Presidency of J. Lynn Mahaffey, M.D., State Health Officer of New Jersey, the following resolution was unanimously adopted.

WHEREAS, the outstanding deficiency in public health administration throughout the North American continent is the lack of overall coverage by legally constituted local health organizations, and

WHEREAS, expansion in the field of public health demands that every segment of the population must receive the benefit of full-time public health protection, and

WHEREAS, studies have been made by the Committee on Administrative Practice of the American Public Health Association for the purpose of evolving a plan for complete public health services, and said committee has reached agreements with the state health officers as to the desirable pattern for full-time public health units in 39 states, representing over 85 per cent of the population of the United States, therefore be it

RESOLVED, that the Conference of State and Provincial Health Authorities of North America urge the early implementation of such a program throughout the Continent of North America.

Chemical Warfare—A Chemical and Toxicological Review*

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IN reviewing very briefly the chemistry and toxicology of the war gases, military secrecy demands that my remarks be confined to chemical warfare agents already known to our enemies, and to data about these known agents which will not give them aid or comfort. This, of course, precludes discussion of newer developments, but there is much unrestricted information which may be unfamiliar and of interest.

Of the many thousands of poisonous substances known, only a few have the necessary toxicity, and chemical and physical properties to qualify them as effective war gases.

CLASSIFICATION OF WAR GASES

The chemical and physical properties of the war gases are of primary importance in determining how and when they may be effectively employed, and in predicting what the enemy may do with them. A simple but important classification of gases in this respect refers to the length of time they are effective. If they persist in toxic concentrations at the point of attack less than ten minutes, they are called *non-persistent* gases; if they are effective for a longer time, they are *persistent* gases.

The toxicological properties of the war gases must be known in great detail in order that the proper gas may be selected to produce a particular effect, and in order to know what concentration of the gas must be put down on the target.

The war gases are classified according to their primary toxicological effects, as follows:

WAR GASES

1. Harassing gases
   a. Tear gas (lacrimator)
   b. Vomiting gas (nose gas; sternutator)
2. Casualty gases
   a. Choking gas (lung irritant)
   b. Blister gas (vesicant)
   c. Blood and nerve poisons (systemic poisons)

The harassing gases are used to force the enemy to put on gas masks and to interfere at a crucial time with his effectiveness. These agents have only temporary effects and they do not kill, or even produce dangerous symptoms. The casualty gases are used to injure or kill.

TEAR GASES

The tear gases are all effective in very low concentrations. The most widely employed are the following:

1. Chloroacetophenone, C_6H_5–CO–CH_2Cl, is a white crystalline solid, which is volatilized either from burning or explosive munitions or sprayed as a solution in chloroform, generally mixed with chloropicrin. Once volatilized it is essentially non-persistent. It has a faint odor, somewhat like apple blossoms.

2. Brombenzyl cyanide, C_6H_5–CH–BrCN, is a liquid, which volatilizes slowly. The

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commercial product is light brown in color. It is used as a liquid spray or in explosive munitions. It is moderately persistent and has a fruity odor.

3. Ethyl iodoacetate, CH_2I–COO–C_2H_5, a brown liquid, is less used. It smells like pear oil.

4. Recently, chloropicrin, C–NO_2–Cl_3, or nitro-chloroform, a pale yellow, volatile liquid, has been reclassified as a tear gas. It also causes vomiting and in high concentration it is an effective lung irritant, making it difficult to classify. It is often used in solution with chloroacetophenone. It is very irritating to the nose and has an odor somewhat like flypaper or anise.

The tear gases (or lacrimators) in low concentrations act almost exclusively upon the eyes to produce pain, blepharospasm, a flow of tears and temporary interference with vision. In high concentrations some also irritate and redden the hot sweaty skin.

VOMITING GASES

The vomiting gases are all crystalline solids and are usually dispersed as fine particulate smokes from burning munitions. They are effective in very small concentrations, but their smokes are non-persistent. They all smell somewhat like burning fireworks.

1. Adamsite, or diphenylamine chloroarsine, $HN=(C_6H_4)_2=AsCl$ produces a canary yellow smoke which fades to colorless as it is diluted by air

2. Diphenylchlorarsine, $(C_6H_5)_2=AsCl$

3. Diphenylcyanarsine, $(C_6H_5)_2=AsCN$, which produce white smokes, which become colorless on dilution with air

The vomiting gases induce at first a strong sensory irritation of the respiratory tract. The symptoms may be delayed a few minutes in their onset, so the victim may get a good dose of the gas before he knows anything is wrong. He then begins rather suddenly to cough, and in the course of a minute or so this becomes quite violent and uncontrollable. He feels as though his trachea was about the size of a balloon and as raw and irritated as a full blown acute tracheitis. He may sneeze some and soon his nose begins to drip a watery secretion. He is quickly salivated, and feels depressed, weak, and ill. If he is severely affected, he will have nausea and vomiting and pain in his teeth and sinuses, particularly the frontal sinuses. These effects, as you may well imagine, make it difficult for the victim to wear a gas mask. A man fully affected by a vomiting gas looks and feels about as miserable as a human specimen can. Fortunately, however, in spite of his alarming symptoms, he is not seriously injured, and it has been demonstrated many times that he is still capable of strenuous physical exertion. If he can be induced by inspiring leadership to carry on, he can do so without injury to himself, and the effects pass off in an hour or two.

CHOKING GASES

The most important choking gases are phosgene and chlorine, both gases at ordinary temperatures and pressures, but are generally liquefied under pressure for storage in cylinders, shells or bombs. On opening the cylinders or bursting the explosive munitions, they rapidly evaporate to form a gas cloud, heavier than air. If conditions are right, that is, the ground as cool or cooler than the air and the wind very gentle, these clouds will drift along the ground in effective concentrations for several miles.

Phosgene, $COCl_2$, is a colorless gas which irritates the eyes, nose, and throat. Its odor is difficult to describe, but it is probably nearer like that of very musty hay or crushed green corn-silk than anything else.

Chlorine, Cl_2, is a greenish-yellow gas with a very pungent, irritating odor familiar to all.

The effects of these gases are predominantly upon the lower parts of the respiratory tract, particularly upon the terminal bronchioles. Their immediate action is to induce coughing, due to

sensory irritation, and a feeling of constriction in the chest and shortness of breath, due to bronchoconstriction. The heart is slowed and there begins very early a deficiency of oxygen in the circulation. The victim is usually uncomfortable, restless, and apprehensive. He develops a moderate temperature and may sweat profusely. A fair percentage of cases of poisoning by phosgene, however, recover from their initial symptoms after the first few minutes, and may then experience a feeling of well-being for possibly several hours, provided strenuous exercise and deep breathing are avoided. The bronchospasm, bronchiolar edema, and loosening of bronchiolar epithelium bring on a curious mixture of emphysema and atelectasis of the air sacs and cut down the functional capacity of the lungs. There follows, after a few hours, an outpouring of fluid into the alveoli, which seriously interferes with gaseous exchange and enormously accelerates the developing anoxia. The fluid lost into this lung edema causes a serious progressive hemoconcentration and slowing of the circulation. Some of the subjects during these stages exhibit a dusky cyanosis, peripheral venous congestion, and a rising blood pressure, known as the "blue stage." It is particularly common in chlorine poisoning. The "blue stage" may subside gradually and eventuate in recovery, or it may gradually or suddenly pass into the "grey stage" of circulatory collapse. Many cases of phosgene poisoning fail to go through a "blue stage," but pass directly into the "grey stage" of falling blood pressure and a series of symptoms closely resembling shock. The skin appears pale and waxy and is cold and dry. Breathing is hurried and shallow, and the pulse is weak and rapid. The victim is extremely weak, and fearful of impending death, until unconsciousness supervenes. Death is due to an intense want of oxygen by the body tissues and a widespread interference with metabolic processes, which culminates in circulatory failure.

BLISTER GASES

The blister gases are all liquids which vaporize slowly to highly toxic vapors. There are three main classes of these gases:

1. The sulfur mustards, which are compounds, containing sulfur
2. The nitrogen mustards, which contain nitrogen
3. The arsenical vesicants, which are compounds of arsenic

Either the liquids or the vapors burn and injure any part of the body they contact. The eyes and respiratory tract are particularly susceptible, but the skin as well is reddened, burned, and blistered. When they are ingested in food or water, they violently irritate the gastrointestinal tract and produce all the attendant symptoms of pain, nausea, vomiting, and collapse. They attack any part of the respiratory tract, but the predominant effect is on the upper portion, particularly the pharynx, larynx, trachea, and bronchii. The ciliated cells of the respiratory epithelium are quickly killed and the whole bronchial tree is laid wide open to infection. Secondary bronchopneumonia is very common in the severe cases, and is responsible for most of the deaths. Direct injury may, however, be severe enough to cause death. Respiratory epithelium, exuded serum and leukocytic cells are shed from the surface of the trachea and bronchii as a coagulated, continuous, tenacious cast extending deep into, and plugging, the smaller bronchii and bronchioles. This plugging may so completely block the smaller air passages that the victim is suffocated. The term "cooked" best describes the appearance of the upper respiratory tract. Intense congestion of the lungs with moderate edema completes the terminal picture.

MUSTARD GASES

The only sulfur mustard which has yet been used is mustard gas itself, $S=(C_2H_4Cl)_2$. This was by all odds the king of war gases in World War I. It caused three-quarters of all AEF gas casualties, and three-quarters of the gas deaths.

It is an oily liquid, colorless when pure, but usually brown as employed in the field. Its odor is variously stated to resemble horseradish or garlic, but it stretches the imagination to note the resemblance. Its odor is quite characteristic and resembles nothing else very closely. It can be dispersed in a wide variety of explosive munitions, sprayed from airplanes, sprinkled on the ground from watering carts, or simply dropped from planes in large tin cans. It contaminates everything it touches and in heavy contaminations slowly gives off its poisonous, blistering vapors for days.

The chemistry of the nitrogen mustards is secret. They are all colorless or pale yellow liquids. Some are less persistent and some are more persistent than mustard gas. Their odors vary from fishy to practically odorless. They do not damage the skin as much as mustard gas, but do a first-class job on the eyes and respiratory tract.

Two great tactical assets possessed by the sulfur and nitrogen mustards are their insidious action and persistence. They produce no immediate pain or effects of any kind, and some have almost no odor. The victim may be severely or even fatally injured without knowing he is being exposed.

The degree of injury produced by a casualty gas is dependent upon the product of time and concentration of gas. Since the blister gases vaporize slowly and persist for a long time, they are effective in extremely low concentrations, provided the victim remains in the contaminated area long enough.

In investigating industrial and laboratory accidents due to the mustards, one cannot help being impressed with the fact that the vast majority of the cases had no idea they were contaminated and being burned. Pain and reddening of the skin do not begin for some hours, long after the damage is done. Even liquid mustard in the eye is only mildly irritating for the first hour, yet the damage is irreparably done in the first five minutes.

Some of the nitrogen mustards are quite toxic by skin absorption and readily cause fatalities in animals. The bone marrow, spleen, thymus and lymphoid tissue in general are severely attacked and an almost complete leukopenia develops. This has not yet been observed in man from skin burns.

ARSENICAL VESICANTS

The arsenical vesicants are all organic dichlorarsines, and all are colorless to brown liquids. They all have sharp irritating odors, and lewisite smells strongly like geraniums. They all hydrolyze easily in contact with water or moist surfaces to yield the corresponding arsine oxide.

Lewisite, $Cl—CH=CH—AsCl_2$, or chlorvinyldichlorarsine, has been widely studied, but has not yet had war experience, unless the Japanese employed it against the Chinese. It is more volatile than mustard, and very damaging to the skin and eyes as liquid drops. It has a very low freezing point and can be used in cold weather when mustard would freeze. It can also be mixed with mustard gas to form a low freezing point mixture. It can be dispersed from explosive munitions or sprayed from airplanes.

The other three arsenical vesicants, called Dicks by the Germans and British, methyl Dick, ethyl Dick, and phenyl Dick, have all had limited war service in World War I. Methyldichlorarsine, $CH_3—AsCl_2$, and ethyldichlorarsine, $C_2H_5—AsCl_2$, are fairly volatile,

and are usually dispersed as a vapor from explosive munitions. Phenyldichlorarsine, $C_6H_5—AsCl_2$, is a heavy oily liquid and quite persistent. Like lewisite, it forms an effective low melting point mixture with mustard gas.

In contrast to the insidious action of the mustards, the arsenical vesicants cause instantaneous excruciating pain upon striking the eye, with immediate blepharospasm. Stinging pain is felt by most subjects within 10 to 30 seconds after a liquid arsenical vesicant contacts the skin. Their vapors are likewise very irritating to the eyes and respiratory tract, which compels wearing of the gas mask. Their presence is therefore quickly obvious, and serious injury from them is proportionately less likely, if defensive measures are available.

The arsenical vesicants can cause very deep burns into the muscle and serious or fatal systemic poisoning by absorption through the skin in animals, because the animal is prevented from doing anything about it. No human subject has yet been so seriously burned or poisoned, however, nor does it seem likely to occur unless the victim is unconscious or defenseless.

BLOOD AND NERVE GASES

The third group of casualty agents is known as the blood and nerve poisons (or systemic poisons). Their local effects are minimal, and their poisonous properties are manifest only after absorption into the general circulation. There are a great many possible compounds in this class, and many have been investigated. I shall, however, refer to only two which have a record of war service.

The only one employed to any extent in World War I was arsine gas, AsH_3. It is a colorless, inflammable, diffusible gas. In its highest purity it is odorless, but the commercial item smells strongly like garlic. It can be liquefied in munitions but special precautions are required to prevent it inflaming upon explosion of the shell. It can be generated at the target in wet weather by dispersing a suitable powdered arsenide, which reacts with water to liberate the arsine.

It acts in a number of ways in the body, widely inhibiting enzyme systems, but it manifests itself clinically chiefly by its striking effect upon the red blood cells. In severe cases it causes widespread hemolysis and much of the liberated hemoglobin is passed in the urine. Coagulated debris collects in the kidney tubules, stained almost black by the hemoglobin, and may eventuate in kidney failure, anuria and a uremic death. During the stage of hemolysis, the victim suffers chills, nervousness, exhaustion, and collapse. He soon develops anemia, and in the course of a few hours jaundice begins to appear. This may progress until he is deeply jaundiced. If he survives the hemolytic stage, he may then develop the typical symptoms of arsenic poisoning. As the gas was employed in World War I, however, there were not so many severe cases, and the mortality was very low—only one-half per cent.

Hydrocyanic acid gas was tried abortively in World War I and given up as ineffective. It was then technically difficult to build up crash concentrations of any gas, and this was particularly difficult to accomplish with a light diffusible gas like HCN.

It is a colorless, highly volatile liquid, boiling at 26.5° C. It is dispersed from explosive munitions as a colorless gas having a faint odor of bitter almonds or peach kernels.

Very low concentrations of HCN can be detoxified and eliminated without the development of any symptoms, but high concentrations are more rapidly lethal than those of any other known gas. The rapidity of onset of symptoms is practically identical with the

circulation time from lungs, through the heart, to the brain. The subject becomes confused, befuddled and dizzy in a few seconds. He is seized with an uncontrollable hyperpnea, the depth of respiration being particularly increased. Great weakness and muscular incoördination come on simultaneously and in 10 to 20 seconds the victim is unconscious and beginning to be seized with convulsions. Respiration stops in a half to three-quarters of a minute, except for an occasional gasp, but the heart continues to beat for several minutes. The chances of survival after respiration ceases are small indeed. HCN is almost wholly an " all or none " gas. The subject is either rapidly killed or he quickly recovers. There are, however, a few borderline cases who, as a result of prolonged anoxia of nervous tissue during the poisoning, either die slowly, or recover slowly, and may be left with permanent neurological damage quite analogous to that which sometimes follows carbon monoxide poisoning. The gas acts primarily to inactivate the cytochrome oxidase enzymes. Thus the blood, while itself fully oxygenated, is unable to supply the tissues, because the tissue cytochromes cannot utilize the oxygen. The venous blood is returned to the heart bright red in color and nearly as fully oxygenated as arterial blood. At autopsy these cases have a pink hue to the skin strongly reminding of carbon monoxide poisoning.

There are two other classes of chemical agents, the incendiaries and screening smokes, which may cause incidental injury to troops, but they are not used for that purpose. There are also other gases incident to war, such as carbon monoxide and the nitric oxides, which may cause injuries or fatalities among troops, but they are not employed as war gases.

I should not like this brief discussion of the war gases to give the impression that these agents as employed in war are extremely lethal. On the contrary, the injuries they cause are many times less lethal than those due to other weapons of war. While they caused nearly one-third of all the AEF battle casualties hospitalized in France, they caused less than 10 per cent of the hospital deaths, the mortality being only 1.75 per cent, compared with a mortality of 8.1 per cent due to other weapons.

A very striking comparison is obtained if all those killed in action or dying before reaching hospital are included. The gas warfare mortality is then almost exactly 2 per cent, while that due to other weapons is 24 per cent, a ratio of 1:12.

Large numbers of wounded are a very serious encumbrance to an army. One of the chief tactical values of chemical weapons is their ability to produce large numbers of casualties with relatively few fatalities.

In closing, I should like to stress that there are no super-colossal war gases, of the variety that one drop on a dog's tongue will kill ten men. It takes very definite and large amounts of chemicals to build up casualty producing concentrations in open spaces. This requirement is so great that it seems most unlikely that our enemies could make more than a small nuisance chemical raid against the continental United States. The most likely supposition is that they will consider the benefits to be derived from such a raid not worth the cost and effort.

Tissue Cultures for Virus Investigations in the Field*†

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FLUID tissue cultures have been used for propagation of viruses since 1928 when Maitland and Maitland [1] initiated the use of their preparation. However, the effect on tissue viability in the fluid environment of ratio of tissue to fluid, pH of menstruum, and method of preparation of tissue have been investigated only in recent years.

That there has been a need for detailed studies is seen from the fact that the early preparations were so crude as to suggest complete destruction of tissue. In fact, Maitland and Maitland [2] reported that they were able to grow virus in the presence of non-living cells, a claim that was negated by Rivers, Haagen, and Muckenfuss,[3] who demonstrated living cells in the Maitland cultures.

In previous reports [4] the use of serum ultrafiltrate diluted with Simms physiological solution has been stressed because of the possibility that this protein-free product of ox serum is capable of maintaining viable tissue cells for long periods of time. Furthermore, such a fluid medium is well buffered and is convenient to handle in the laboratory. Maintenance of viability also depends on a low ratio of tissue volume to fluid volume, 1–100 or less, a pH range of 7.2 to 7.6, and the use of a closed culture system (rubber-stoppered flasks). In order to minimize damage to cells during preparation great care should be taken to use sharp instruments for mincing, and the tissues should be washed at least 3 times with decarbonated "Z" solution to remove intracellular autolytic enzymes.

The present communication will attempt to correlate certain information obtained during the course of investigating fluid tissue cultures in regard to virus propagation and to point out possible application of laboratory methods to field studies in virus diseases. Although this study covers a period of more than two years, only summarized or typical data will be presented.

MATERIALS AND METHODS

The various types of *field cultures* as described below consisted of minced chick embryo tissue in 2 ml.* of fluid medium in rubber-stoppered Wassermann tubes. The convenience of working in the field with tubes of this size,

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† This work has been carried out largely under the auspices of the Commission on Neurotropic Virus Diseases, Board for the Investigation and Control of Influenza and Other Infectious Diseases in the Army, Preventive Medicine Division, Office of the Surgeon General, U. S. Army.

* It should be emphasized that larger amounts of fluid medium (and consequently more tissue) may be desirable for certain types of specimens. It is obvious, for example, that sputum can be studied in larger cultures (50 ml.). The amount of medium should vary according to the type of inoculum. In the present study 2 ml. lent itself to manipulation of small amounts of material.

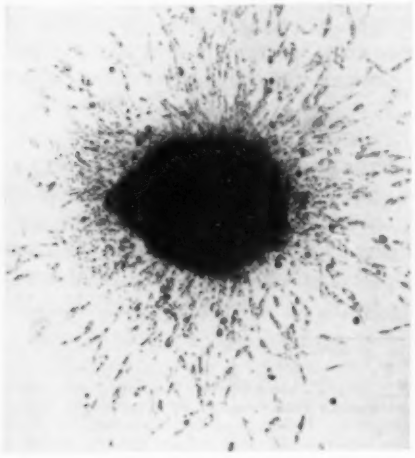
which can be carried in one's vest pocket, is obvious.

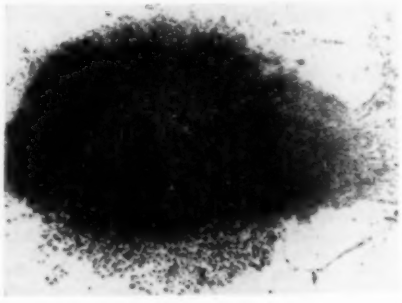
At intervals during storage of these cultures, pieces of tissue were removed and plasma-patched in Carrel flasks to test the viability of cells. At the same time, varying amounts of virus were inoculated into the tubes to determine the degree of propagation of virus in cultures of different ages.

Daily observation under the microscope of the presence or absence of proliferating fibroblasts in the Carrel flask subplants made it clear whether or not tissue was viable. Such subplants were used because tissue suspended in a fluid medium will generally not proliferate unless a semipermeable coagulum is present for support of delicate cellular filaments. It may be noted that an embryonic cell may be *alive* without retaining a capacity for proliferation. Conversely, a cell may be in good morphological condition and not be viable. The test of ability to proliferate may be looked upon as a gross and positive sign of cell viability.

Culture Media which were compared consisted of 3 types: serum ultrafiltrate diluted with 2 parts of Simms physiological solution, the physiological solution alone, and diluted serum ultrafiltrate containing a sulfadiazine mixture (9 parts sodium sulfadiazine and 1 part of sulfadiazine). All solutions contained either 2 or 5 mg. per cent phenol red so that the pH could be followed at all times. The pH range was adjusted carefully with 5 per cent CO_2 after the culture was completed and again whenever there was occasion to open the flasks. The formulae for the solutions and more specific details in handling them may be obtained from previous reports.[4]

Tissue—The tissue consisted of whole minced 9 day chick embryo. The eyes and claws were discarded and the tissue was finely minced so that the largest segment did not exceed 2 mm. in diameter. After at least 3 washings with 10 ml. of decarbonated "Z" solution, one drop of tissue was placed in the fluid medium. While it is difficult to state exactly how much tissue was placed in each tube, it should be noted that the tissue suspension is fairly uniform regardless of the amount of washing fluid since the container, usually a Petri dish, is tilted allowing the tissue to settle. The diameter of the pipette is approximately 3 mm. so that one drop of minced tissue is well within the range of the optimal 1–100 fluid to tissue ratio.





FIGURES 1 AND 2—Tissue from Serum Ultrafiltrate after 35 Days at Room Temperature in Tube Cultures (Note luxuriant growth of fibroblasts)

Virus — Equine encephalomyelitis virus (Western strain) was used for these experiments because it has been studied previously in serum ultrafiltrate[3] and because it is representative of a group of viruses which can be grown at will and which are important subjects for field investigations. Although the virus was maintained in mice and in tissue cultures, only the latter was used as source of virus in this investigation.

EFFECT OF PROLONGED INCUBATION AT ROOM TEMPERATURE (25° C. ± 7°) ON THE FIELD CULTURES

As is apparent from Figures 1 and 2, tissues maintained for 35 days at room temperature were viable and capable of proliferation. This finding in respect to the majority of segments in the *field cultures* was repeated and confirmed on many occasions. Although longer periods of time were not tested routinely, there is on record a single instance of viability of tissue after 42 days at room temperature. This fact plus the constancy with which tissue viability could be demonstrated after 35 days, suggests that this interval is not a maximum.

When the physiological solution alone was used without serum ultrafiltrate, tissue viability could be demonstrated only for much shorter periods of time, up to about 14 days (Figures 3 and 4).* For periods up to 1 week it appears to make little difference whether one suspends tissue in physiological solution alone or in serum ultrafiltrate. However, it should also be noted that in serum ultrafiltrate cultures there is little variation in pH from culture to culture and the medium is so well buffered that the shift in pH under various circumstances is minimal.

EFFECT ON THE TISSUE OF VARYING TEMPERATURES

Inasmuch as one may expect in the field a greater variation in temperature than is found in a laboratory situated in the temperate zone (25° C. ± 7°) the above experiments were repeated under more extreme temperature variations. Because serum ultrafiltrate had been demonstrated on the basis of plasma studies to be the superior tissue medium, study of the field cultures at refrigerator temperature (+4° C. to +6°C.) and at 37° C. was carried out

* A photographic record of 21–28 days only is available. From actual observation growth of cells in salt solution alone was sparse, irregular, or absent from 14 days.

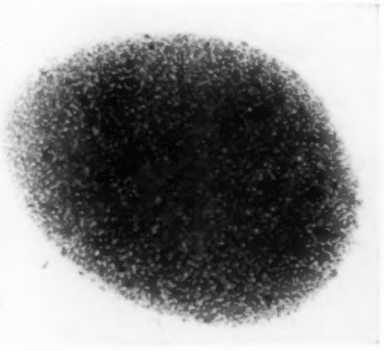


FIGURE 3—Tissue from "x6" Physiological Solution after 28 Days at Room Temperature in Tube Cultures (Note absence of fibroblasts in the vicinity of the Explant)

FIGURE 4—Tissue from "x6" Physiological Solution after 21 Days at Room Temperature in Tube Cultures (Note rare fibroblast)

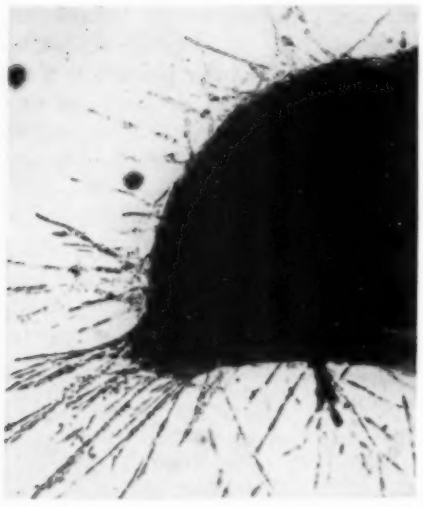


FIGURE 5—Tissue from Serum Ultrafiltrate after 22 Days at +4° C. in Tube Cultures

with this medium only. In brief, repeated tests showed that at 37° C. tissue remained alive for at least 4 weeks (Figure 6), and at 4°–6° C. tissue viability could be demonstrated for periods as long as 3 weeks (Figure 5). With respect to the latter finding it is interesting to note that cultures in which virus had been propagated at either incubator or room temperature have been placed in the refrigerator for several months with only gradual and relatively slight loss of virus potency. We have made use of this fact for maintaining "auxiliary cultures" which may be used for seeding purposes when contaminations or other accidents damage cultures.

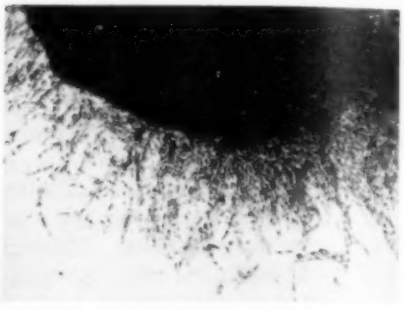


FIGURE 6—Tissue from Serum Ultrafiltrate after 28 Days at 37° C. in Tube Cultures

TABLE 1

Comparative Potencies of Field Cultures of Varying Age (Virus Inoculum: One Drop of 10^{-4} Dilution of Virus-containing Culture Having a Potency of $10^{-4.2}$)

Type of Preparation	*Incubated* *	*Age of Cultures at Time of Inoculation*					
		1 Day	*7 Days*	*14 Days*	*21 Days*	*28 Days*	*35 Days*
Serum ultrafiltrate plus "x6" physiological solution (Simms)	Room temp.	$10^{-5.8}$	$10^{-4.2}$	$10^{-4.8}$	$10^{-4.6}$	$10^{-5.2}$	$10^{-4.8}$
Serum ultrafiltrate plus "x6" physiological solution (Simms)	37° C.	—	—	—	$10^{-5.2}$	$10^{-4.2}$	
Serum ultrafiltrate plus "x6" physiological solution (Simms)	Icebox	—	—	—	$10^{-3.0}$	trace	
"x6" physiological solution (Simms)	Room temp.	$10^{-5.0}$	$10^{-5.2}$	0	0	0	0
Serum ultrafiltrate plus 50 mg. per cent sulfadiazine mixture in salt solution (Simms)	Room temp.	$10^{-4.6}$	$10^{-4.5}$	$10^{-4.5}$	$10^{-4.0}$	$10^{-3.5}$	$10^{-3.5}$
Serum ultrafiltrate plus 85 mg. per cent sulfadiazine mixture in salt solution (Simms)	Room temp.	$10^{-4.5}$	$10^{-4.5}$	$10^{-4.5}$	$10^{-3.5}$	$10^{-3.5}$	$10^{-3.5}$
Serum ultrafiltrate plus 100 mg. per cent sulfadiazine mixture in salt solution (Simms)	Room temp.	$10^{-4.8}$	$10^{-5.2}$	0	0	0	0

* Incubation and age of culture refer to culture environment before virus was inoculated. After addition of virus, *all* cultures were placed at 37° C. for 45 hours and were then tested for potency in mice.

CORRELATION BETWEEN TISSUE VIABILITY AND VIRUS GROWTH

As can be seen from Table 1, propagation of virus is closely correlated with tissue viability and even in 35-day-old room temperature cultures LD_{50} of $10^{-4.7}$ was obtained. Since Table 1 is a summary of experiments where the original virus inoculum represented one drop of the final dilution activity of culture used for seeding, it is clear that there was a significant increase of viral potency in the majority of instances where tissue viability had been demonstrated.

ADDITION OF A BACTERIOSTATIC AGENT TO THE FIELD CULTURES

Since the *field cultures* are intended for use in recovering virus from contaminated specimens in the field, the effect of adding a bacteriostatic agent to the fluid medium was investigated. For this purpose a sulfadiazine mixture was used (9 parts of sodium sulfadiazine plus 1 part of sulfadiazine) which was soluble and which did not cause a marked change in pH. Concentrations of 50, 85, and 100 mg. per cent of the sulfadiazine mixture were added to the cultures and studied at various intervals in a fashion similar to that described in the previous sections for the earlier preparations. Examination by the viability test of the tissues which contained the drug revealed that there was some toxic action since, as may be seen from Figure 7, fibroblastic proliferation was not as luxuriant as in those instances when the bacteriostatic agent was absent. Furthermore, the toxicity appeared correlated with the concentration of sulfonamides, the 100 mg. per cent showing no growth after 7 days. On the other hand, with levels of 50 and 85 mg. per cent the sulfadiazine was not so deleterious as to prevent appreciable virus growth even at 35 days at room temperature since minimal inocula of virus in these preparations yielded dilution activities of $10^{-2.6}$ (see Table 1). The 21-day tests were more satisfactory and were active 10^{-4}. In view of the toxic action which the sulfadiazine appeared to exert on the tissues it has become customary to add the drug to the culture at the time of testing unknown specimens. In two series of tests which have been done since the present communication was completed, the *field cultures* have been used for recovery of virus from sputum and from contaminated mosquito suspensions.

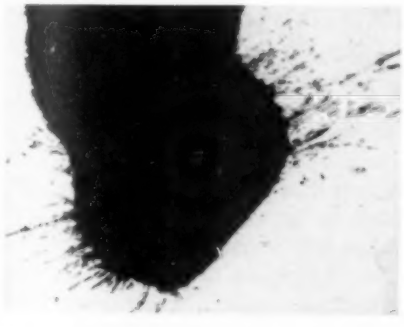


FIGURE 7—Tissue from Serum Ultrafiltrate Containing 85 mg. Per cent Sulfadiazine Compound after 35 Days at Room Temperature in Two Cultures (Compare with Figures 1 and 2)

In the case of sputum * a virus was recovered, but its place among the filterable agents has not been conclusively demonstrated beyond the fact that the agent almost certainly was correlated with the patients' pulmonary infection. However, it is of interest that following centrifugation in the Swedish angle the sputum could be tested in the *field cultures* containing 50 mg. per cent sulfadiazine without bacterial overgrowth taking place to such an extent that animal inoculation could not be carried out.

Preliminary investigations of contami-

* Unpublished data—Sanders, Bullowa, and Alexander.

nated mosquito suspensions * (kindly provided by Dr. W. McD. Hammon) have demonstrated the ability of the *field cultures* to carry contaminated inocula without overgrowth of bacteria. Furthermore, in two other experiments whole untreated mosquitoes have been placed in the bacteriostatic environment of the sulfonamide-containing cultures. Although no virus appeared to be present, it was interesting to note that the heavy contamination present in the whole mosquitoes became progressively lighter by serial passage in the field cultures until bacteria-free cultures were obtained.

How useful the cultures will be for detecting and recovering virus from specimens remains to be seen. Yet in view of previous work there is every reason to expect them to be satisfactory indicators of the presence of viruses capable of proliferating in the presence of embryonic chick tissue. Additional data based on the use of more highly differentiated tissue (e.g., embryonic mouse brain) will be forthcoming in the future.

* Unpublished data—Sanders and Alexander.

CONCLUSIONS

1. Small amounts of embryonic tissue in 2 ml. of serum ultrafiltrate have remained viable at least 35 days at room temperature (25° C. ± 7°) for at least 4 weeks at 37° C. and 3 weeks at 4° to 6° C.

2. Numerous cultures can be made from one chick embryo and no manipulation of the cultures is necessary for the periods designated.

3. The addition of sulfadiazine mixtures have a slightly toxic effect on the tissues, but the drugs may be used as bacteriostatic agents so that contaminated specimens may be tested for virus content.

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Philosophy and Future of Milk Control*

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SANITARY milk regulation has developed slowly, haphazardly, and with little geographical uniformity. It began at points of densest population where adequate supply and distribution were major problems. Its most insistent stimulus has come from recurring epidemics and chronically high death rates among infants and children, supplemented by the economic demand for milk with keeping qualities outlasting the period between production and consumption. Being dependent on public health organization, milk control has necessarily been irregular and inefficient to the degree that local health agencies have lacked purpose and qualified personnel.

Because the future must grow out of the past, it is appropriate in discussing what may hereafter develop in milk control to review briefly the way in which we have arrived at the present stages of regulation and sanitation.

It was just fifty years ago that Nathan Straus began the free distribution of pasteurized milk on the lower east side of New York City, with results confirming his conviction that general pasteurization must become the safeguard of this essential children's food. Minnesota enacted a dairy inspection law in 1895. In 1896 the permit system for milk dealers was initiated by New York City, although its legality was not finally established until 1905 when the Supreme Court ruled in favor of the city department of health; country milk inspection began in 1906; grading was instituted in 1912 when pasteurization was prescribed for Grade B milk. Not until 1926, however, was the sale of raw market milk in New York City completely prohibited and Grade C eliminated. The ultimate objective of a single grade of milk was achieved in 1940 with the adjustment of A and B requirements in both New York State and City to a set of standards applicable to all pasteurized market milk. A further significant step has now been taken by New York City in eliminating the sale of certified raw milk except on physician's prescription. A similar series of events came about in Chicago and they have been and are being duplicated in condensed form in many other urban areas.

A factor which has contributed tremendously to this transition of milk from dangerous irresponsibility to respectability has been the milk ordinance of the U. S. Public Health Service. The ordinance was first offered for general use in 1924, an interpretive code added in 1927, followed by frequent revisions and refinement of its subject matter.

The standard milk ordinance represents a synthesis of the experience and conclusions of the pioneers in milk

* Presented before the Engineering Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 13, 1943.

sanitation. These pioneers worked in an uncharted field with the untried tools of chemistry, bacteriology, mechanics, and government regulation. When they had demonstrated a large measure of success, their experience became the basis for a comprehensive ordinance and code designed to provide in any virgin area a complete regulatory instrument for milk sanitation.

The Public Health Service was in position to evolve such an instrument with a maximum of detachment from the actual problems of enforcement and the interplay of those forces which, in any given milk shed, profoundly influence the course of milk regulation. The Public Health Service was free to study the theory and practice of pasteurization experimentally and to incorporate all the refinements and to provide for all the conceivable contingencies that could affect the safety of milk.

The standard milk ordinance and its principle of grading were designed for adoption and enforcement in areas where the milk supply had not previously been subjected to effective sanitary control. Emphasis was necessarily placed upon farm inspection and upon those requirements tending to promote safety in raw milk. In actual experience, the goal of complete pasteurization was usually remote, and the immediate problems were to impose uniform regulations and to eliminate, as quickly as possible, inferior dairies and low grade milk. An interesting element of the ordinance has been the advisory relationship which the Public Health Service has attempted to maintain over the areas adopting it. This has involved a system for measuring enforcement and progress under the ordinance and a reporting to the Public Health Service at regular intervals for purposes of publishing compliance ratings.

The widespread use of the Public Health Service milk ordinance is indicated by its adoption by 135 counties and 984 municipalities having a total population of 25,000,000 and located in 37 states and 1 territory (*Public Health Reports*, Vol. 58, p. 320, Feb. 19, 1943, and personal communication, A. W. Fuchs). On the basis of 90 per cent or more compliance with ordinance provisions, about 170 of these are currently listed as satisfactory, although not all of the communities are subjected to the qualifying surveys.

In the past several years, some conflict and controversy have arisen between the proponents of the standard milk ordinance and those who have developed and enforced other bodies of milk regulations. The Public Health Service would achieve uniformity in milk regulation by substituting the standard milk ordinance for all older systems and, in theory at least, bring all milk control areas under the advisory and coördinating influence of the federal agency.

Those who have been closely associated with the older but less definitive regulations have generally opposed their replacement by the standard milk ordinance for several reasons. First, the assumption on the part of the supporters of the standard ordinance that its particular form and completeness of detail somehow assure a higher quality of milk disregards the fact that the personnel and morale of the enforcing agency are the prime factors in achieving results.

Second, the emphasis upon farm inspection in the standard ordinance, while necessary in the early and educational phases of milk regulation, is not as productive of results as is deck inspection with its economy and directness of effort in the older milk sheds. The differences should be recognized between the milk shed subjected to initial regulation and starting with only a small percentage of clean herds, good barns, milk houses, refrigeration, and so forth,

and the milk sheds where several generations of dairymen and milk handlers have become accustomed to regulation and accepted the routine technics and provided, as a matter of course, the physical facilities for clean milk production.

Third, there is a fundamental difference of opinion regarding the degree to which police power should be used by a regulatory agency. Until recent years, it has been generally accepted policy to restrict the use of police power to the attainment of minimum objectives of public safety. Consequently, necessity has largely dictated the content and extent of the older regulations in their slow evolution. On the other hand, the standard milk ordinance is a full-blown instrument which appears to go beyond the level of a reasonable degree of safety in milk. It stresses method and procedure rather than end results and, with respect to the process of pasteurization, sets up requirements of mechanical safeguards for every type of failure or interruption of routine which can be remotely anticipated. Is it desirable to burden both the plant operator and the inspector and to complicate plant equipment with precautionary devices and procedures which rarely, if ever, are required to function? Safety is relative rather than absolute, and a high degree of safety has been achieved by basic pasteurizing equipment and responsible operation. Should not our objective be a minimum rather than a maximum of regulation so long as it achieves the practical objective of eliminating pasteurized milk as a factor in communicable disease?

In the history of milk regulation, the city or local political subdivision has been the chief functioning agency. States have in the past largely ignored what might be considered an acute local problem. It is, therefore, only as the benefits of local sanitary control have been demonstrated that state agencies have been forced to recognize their responsibilities in promoting official supervision wherever milk is commercially handled in quantity. In the absence of such state participation we have that anomalous situation wherein large cities are forced to maintain widespread country milk inspection services which operate to the benefit of satellite communities and lesser cities within the milk shed, without their sharing in the cost or the responsibility. To the extent that the lesser communities do carry on country milk inspection, there is duplication of effort and sometimes conflict and confusion. Yet these communities are not in position to make demands upon or to influence the course of sanitary control by the dominant local health agency.

Country inspection by a city is further unsatisfactory in that it is without police power at the point of inspection and the only punitive measure possible is exclusion of the dairy. Exclusion of a bad dairy frequently results in the sale of its milk in the local area where control may be negligible. Such milk, rejected for pasteurization, is certainly unfit for consumption as raw. The frequency of epidemics involving raw milk in rural areas is not unrelated to this form of inspection which has responsibility only to a limited and distant population.

The answer to this situation is, of course, the assumption by the state of dairy inspection and certification on behalf of all political subdivisions within the state. Only in this way can the quality of milk be improved for small towns and villages now unable to maintain even rudimentary milk control. The tax burden for this service would be equitably spread upon all the population served through a single state agency. This agency should be the state department of health. In a proper relationship between state and local health departments, the latter

could expect and demand efficient and responsible service in the sanitary control of distant milk sources, and the state could in turn require such local farm inspection on behalf of the statewide program as local personnel, resources, and circumstances would permit. Only in this way can local health authorities concentrate their major attention on processing and the condition of milk upon delivery. Only in this way can milk as a commodity be freed from present artificial restraints upon movement, and economics be effected through actual competitive marketing. Further, it is only in this way that milk going directly into dairy products such as butter and cheese can be subjected to the sanitary control it has so generally lacked for these uses.

Objection may be made to this proposal on the grounds that the local unit, vitally concerned with milk quality, would relinquish a responsibility to the state where it might be discharged with less severity and thoroughness. To this, the answer should be that sanitary control of milk will not be efficient or thorough, either on state or local levels, if adequate and technically qualified personnel are not employed. Given a well directed and staffed state organization, systematic and effective dairy inspection becomes a matter of professional responsibility, requiring only financial support and freedom from political interference.

In New York State, a legislative act requires all dairies outside and selling within the state to be inspected and approved by the State Health Department.

While the motive of this legislation was restrictive as to competition, and therefore questionable, it has resulted in a demonstration of the practicability of dairy inspection carried on at the state level and points the way to its logical extension to the sanitary control of all milk supplies used within the state for whatever purpose and from whatever source.

In our contemplation of the future of milk control, we must recognize the fact that large volumes of milk daily move interstate. This movement has been largely within well defined milk sheds and restricted by the inspection limits of some health authority, supplemented in its control, perhaps, by a federal marketing agency. However, the war has suddenly disturbed this situation and caused new concentrations of populations at points remote from adequate milk sources. For example, to meet these changed conditions, milk is now being shipped from New York to Georgia and from Minnesota to Florida for pasteurization and fluid consumption. The disruption of milk sheds has forced a modification of milk regulations, including the formulation of the "Emergency Sanitation Standards for Raw Milk for Pasteurization" for those areas receiving milk from non-standard ordinance jurisdictions.

Prior to this modification in December, 1942, a situation had developed in which the universal adoption of the standard milk ordinance was being urged as in the national interest to make possible the movement of milk to points of increased civilian and military use. At the same time, surveys were being made to determine the acceptability, under standard ordinance provisions, of milk from areas such as the New York City milk shed. These surveys, by the ratings obtained, apparently determined that milk daily consumed in New York City was unsatisfactory and, therefore, by inference, unsafe to be received by a Georgia pasteurizing plant. Such findings were derived chiefly from differences in requirements relating to dairy farm equipment and inspection procedures rather than from any comparison or determination of milk qualities. Because such a position was untenable, certain stand-

ard ordinance areas have since modified their requirements to the extent of adopting the emergency sanitation standards, previously referred to, as applied to milk imported for pasteurization.

There has long been a cry for greater uniformity in milk regulations. Uniformity can be achieved only as all authorities are willing to examine the content of regulations in the light of reasonable objectives of safety and in the broad perspective of interstate traffic in milk unhindered by artificial barriers. The present war has forced a long step in this direction and the future may be revealed somewhat by projecting these trends.

One of the most persistent barriers to uniformity is the unwillingness of one health jurisdiction to recognize enough good in the milk control activities of another to warrant acceptance of its milk. This attitude, combined with the provincial opposition to distant commodities competing with home products, supports the arbitrary restraints now impeding the movement of milk between cities and between states. These restraints admittedly developed when effective milk control was the exception and were necessary to exclude inferior milk from quality markets. But we are coming to a time when milk control in the larger market areas will be found increasingly effective. How then may one community be assured of the antecedents of a surplus or a regular supply of milk from another producing area without maintaining a costly and burdensome inspection service?

The first requirement, to return to a previous thesis, is the state-wide inspection and certification of dairies by a state authority, preferably the state health department. Within the state, certainly, regulations affecting market milk should be uniform, and the inspecting agency should be an acceptable supervisor, coördinator, and clearing-house for milk sources under either local or direct state inspection. The state agency should have both the machinery and the fortitude either to reject the milk from substandard local areas or to supplant local by state inspection until conformity is established.

If this is a rational and desirable arrangement within a state, what of the interstate relationship? States are no more willing than municipalities to accept unverified representations of milk quality. The need, therefore, is for a certifying agency of standing and technical competence to function on a national scale. For this rôle, the U. S. Public Health Service is the obvious choice.

The present system of certification of shellfish has demonstrated the efficacy of such an arrangement. The Public Health Service acts in a supervisory capacity in determining whether the shellfish as produced in a particular state conform to an accepted standard. Such a state reports to the Service those dealers and shippers who conform to such state enforced regulations. The Public Health Service, in turn, transmits such lists to other states and municipalities certifying that they are satisfactory. If the standards or enforcement within a state are unsatisfactory, the Public Health Service may (and does) withhold certification of all its shellfish products. While this system may not prohibit the interstate movement of shellfish from such a state, responsible health departments generally by local regulation prohibit the sale of shellfish not so certified, thus making the system work.

For such a procedure to function for milk, it is necessary that at least some states establish dairy inspection at the state level. The procedures for this purpose must have substantial uniformity as between states and must be acceptable to the Public Health Service.

The achievement of such uniformity and agreement will first require, on the part of the Public Health Service and many state and local health departments, a considerable exercise of statesmanship and a vision of the greater good. Arbitrary attitudes and extremes of perfectionism, conservatism, and local pride will have to be sacrificed to some extent in such a coöperative undertaking. The real objective is, of course, not mere similarity in the wording of milk codes, but substantial conformity to standards of personnel performance, coverage of milk sources, and maintenance of actual milk quality.

At the present time a committee of the International Association of Milk Sanitarians is assigned to make a survey of milk regulations and the extent to which they lack uniformity. Public health and technical organizations concerned with milk sanitation should foster every tendency toward widespread distribution of milk control on a basis of unhindered reciprocity between states and cities so that public health factors will no longer support artificial barriers to the movement of milk to market.

We must recognize that a time is coming when milk will be transported half way across the continent by tank plane, and milk inspectors will hop from dairy farm to receiving station by helicopter. Let us speed the day when milk will no longer be criminally suspect merely because it has been transported from one place to another.

DISCUSSION

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THIS is an excellent paper and an interesting subject for discussion. The central theme is the need for greater uniformity in milk sanitation standards to avoid duplication of inspection and to promote the free flow of milk from one milk shed to another both interstate and intrastate.

Only those who wish to erect a Chinese wall around their milk shed to shut out competitive milk supplies will quarrel with this theme. Members of the industry supplying different markets are confronted with a real problem arising from the multiplicity of milk laws and regulations in effect in different states and even in different cities within the same state. Milk control agencies are burdened with the expense of overlapping inspections. Certainly the public health must be safeguarded, but this can be accomplished by the adoption of uniform standards which would make possible the mutual acceptance by one area of inspection reports made by another.

For many years the Public Health Service has directed its efforts at promoting an adequate and uniform milk sanitation program and organization in each state health department to promote and supervise uniform local control. It has recommended a model milk ordinance for voluntary state and local adoption. This ordinance is now in effect in 135 counties and 984 municipalities ranging in size from under 1,000 to 3,500,000 with a total population of approximately 25,000,000. These areas are located in 37 states and Alaska, i.e., in all except California and the 10 northeastern states. In addition, 14 states have adopted it in whole or in part as state regulations, and 6 more have enacted state laws incorporating its grade definitions. In 1931 the

model ordinance received the approval of the Bureau of Dairy Industry of the U. S. Department of Agriculture. It has been recommended repeatedly for general adoption by the Committee on Milk of the Conference of State and Provincial Health Authorities. In recent years it has been used as a basis for the federal specifications for fresh milk, applicable to all federal departments and agencies, including purchases for the Army and Navy. Its standards are also incorporated in the Interstate Quarantine Regulations to govern milk served on interstate common carriers.

As the Public Health Service milk ordinance is in effect in a far greater number of communities and over an overwhelmingly wider area than any other set of standards, it is logically the one that should be supported by everyone who realizes the need for uniform regulations. The ordinance has passed through the crucible of many revisions suggested by research and experience. There is no reason why it could not be further improved, if necessary, along such lines as may be acceptable both to areas now using it and to those which might use it.

The paper under discussion lists several reasons why certain areas are opposed to the recommended ordinance. Is it not significant that objections to this program come almost entirely from persons who have had no actual experience with it, rather than from those who operate under it and are thus in position to appraise it properly? That is because some of the objections are based on misconceptions regarding its contents and operation. It may therefore be profitable to examine some of the author's statements.

1. It is alleged that the recommended ordinance with its grading provisions is designed for areas without previous effective milk control. This indictment is not in accord with the evidence. Many areas with long experience under other ordinances or regulations also employ a grading system. In 1936, 86 per cent of the municipalities in New England and the Middle Atlantic States which returned our questionnaire reported the use of grades.[1] True, in some cases the grades are designated by such terms as "select," "inspected," "guaranteed," "special," "market," and "family," rather than by letters; but it is grading, nevertheless. Furthermore, many cities with previous milk control experience are now using the Public Health Service program; among the larger ones are Atlanta, Chattanooga, Charlotte, Chicago, Dallas, Fort Worth, Houston, Indianapolis, Jacksonville, Kansas City (Kans.), Kansas City (Mo.), Knoxville, Louisville, Memphis, Miami, Oklahoma City, Portland (Ore.), Richmond, St. Louis, Salt Lake City, San Antonio, Seattle, Tacoma, and Tulsa.

Incidentally, two aspects of the grading provisions of this ordinance are frequently misunderstood and deserve clarification. First, there is the misconception that all of the grades defined in the ordinance are actually sold in all areas operating under it. This is not the case, since section 8 is flexible and leaves to the adopting community the decision as to which grades shall be prohibited. Chicago, for example, permits the sale of only one grade—Grade A pasteurized. Second, there exists the impression that Grade A as defined in this ordinance is a supergrade commanding a high price differential. This may be true in certain areas operating under other regulations, but it is diametrically opposed to the philosophy of the Public Health Service ordinance. Under the latter, Grade A is the normal grade available to everyone at normal prices; the lower grades are usually sold in the larger cities only during periods when a Grade A supply has been temporarily degraded for failure to comply with the Grade A standards.

2. It is alleged that the completeness of detail of the ordinance is a burden both to the plant operator and the inspector, that it is more important to have qualified inspectors, and that our objective should be a minimum rather than a maximum of regulation. This complaint undoubtedly represents a failure to distinguish between the ordinance and the code. Only the ordinance portion is adopted locally, and this occupies less than 17 pages of *Public Health Bulletin 220*—a briefer instrument than many other city milk ordinances and state regulations. The remainder of the 160 page *Bulletin* consists of the explanatory code, which gives the public health reason for each requirement and details of satisfactory compliance. It is the very detailed nature of the code, indeed, that makes it so valuable to those who use it, for it promotes uniform enforcement, avoids unreasonably stringent interpretations on the part of some inspectors and too lenient ones by others, and reduces disagreements with the industry. The code material on pasteurization incorporates the results of many researches and provides reference material to guide the inspector on a highly technical subject. It has resulted in greater uniformity and higher standards for equipment manufacturers. It has served as a textbook in many colleges, and has been widely termed the "Milk Inspector's Bible."

The need for qualified inspectors has long been recognized and supported by the Public Health Service in many ways. That, however, is irrelevant to the immediate question. The same inspector will be better qualified if he has available a definite detailed technical guide than if he relies on unwritten regulations or his own whims. To allege that the detailed explanations in the code are a burden on the plant operator and the inspector is equivalent to saying that newspapers are a burden on the public, or that a textbook is a burden on the student, or that the *American Journal of Public Health* is a burden on our members. On the contrary, far from being a burden, the pasteurization standards of the code have been followed by some of the best plants and by many inspectors outside of Public Health Service ordinance areas.

3. The next allegation made in the paper is that the recommended ordinance places too much emphasis on farm inspection and too little on less expensive deck inspection, that it stresses method and procedure rather than end results. This question merits more detailed consideration than the time limitation will permit.

Farm inspection is necessary not only to insure proper equipment and to detect insanitary technic, but, more important still, to educate the producer in correct methods. A good inspector is primarily a good educator, and the educational approach is more effective in the long run than the policeman attitude. It is reasonable to suppose that the higher the inspection frequency the better the results. One milk inspector observed that bacterial counts rose during a period when he was without an assistant and when the frequency of farm inspection was therefore reduced. However, an inspection frequency above the optimum fails to achieve results commensurate with the cost. Our 1936 questionnaire survey revealed that producing farms throughout the country were officially inspected an average of 7.7 times per year, and that 30 per cent of the municipalities were inspecting them monthly or oftener.[2] The Public Health Service ordinance requires a minimum of 2 inspections per year. By contrast with average practice, this frequency cannot be considered excessive by any stretch of the imagination. Indeed, the ordinance has been criticised for not specifying a greater frequency.

Laboratory and deck examinations are valuable, but they cannot be relied upon as the sole means of judging milk quality. A milk supply with a low bacterial count may be secured from farms with infected cows, insanitary privies, germ-laden flies, improperly sterilized milk utensils, unprotected wells, and even moderately unclean milk handling under low temperature conditions. It may be argued that pasteurization renders such milk safe. But pasteurization is subject to human frailty, slips occasionally occur, heat-stabile enterotoxins may not be completely destroyed, and disease outbreaks from improperly pasteurized milk are reported none too rarely. As long as there are no routine tests capable of detecting all pathogens in milk within the brief period between production and distribution, it is impracticable to determine with certainty the safety of a supply solely by testing the milk. Samples for such tests as are available, including bacterial and phosphatase, cannot be taken with sufficient frequency and in sufficient volume to represent adequately the entire supply. There is as yet no universal agreement among laboratory men on such a fundamental question as the most suitable bacterial tests among the plate count, the direct microscopic count, and the various reduction tests. In addition, our recent surveys of milk laboratories throughout the country indicate that nearly all milk laboratories depart to a greater or less degree from *Standard Methods* and that many of the results are consequently unreliable. Finally, it should be remembered that safety is not the only criterion of quality. Milk must also possess a maximum of palatability if greater and more widespread consumption is to be promoted in the interest of improved nutrition. Palatability is largely the result of clean methods of handling on the farm.

What conclusion can we draw? It seems inescapable that neither inspection alone nor laboratory methods alone can be relied upon for proper control of milk production. The milk sanitarian would be unwise if he refused to utilize all the tools at his disposal. The Public Health Service ordinance stipulates at least 2 farm inspections and 8 bacterial and temperature samples from each producer per year. It is conceivable that this program might be improved by requiring, in addition, a minimum frequency of deck examinations at the receiving platform, provided that deck examinations are proved to be feasible for small plants in small milk sheds. It is hardly likely, however, that a single farm inspection per year would be acceptable during peacetime to areas outside the northeastern states. The argument on costs is not convincing: in 1936 the average expenditure for official local milk control in the 3 southern geographic divisions was approximately 6.2 cents per capita as compared with 6.8 cents in the 2 northeastern divisions,[3] and if industry costs were added the difference would be considerably greater. Perhaps the future will reveal what combination of inspection, sampling, and deck examination frequencies will produce the best results at the least cost.

Having discussed the objections listed in the paper to the Public Health Service milk ordinance, let us now return to the author's main thesis, namely, the need for greater uniformity in milk regulations. To avoid duplication of effort and to promote the free flow of milk, he proposes that the state should assume dairy inspection and certification on behalf of all political subdivisions within the state. Theoretically, state-wide control should be more efficient and more economical than local control. That it has not been generally adopted would indicate a prevailing preference for local control. Adequate state-wide control would re-

quire so large a staff that the program would be in constant jeopardy of being disrupted or crippled through failure of continued appropriations or through constant pressure for the appointment of political inspectors. With local control, on the other hand, these dangers affect individual cities only, not the entire state. This need be no cause for discouragement, however. Experience indicates that state-wide control is not necessary to achieve uniformity, since uniformity has been attained to a considerable extent by the local adoption and enforcement of a uniform ordinance under the supervisory guidance and leadership of a limited state staff. There are now quite a number of states in which practically every municipality has voluntarily adopted the Public Health Service ordinance.

Nor would state-wide control solve the problem of interstate barriers even if all states adopted the same regulations. We need not only uniform standards but also uniform interpretation and enforcement. The Public Health Service recognized long ago that the mere adoption of uniform legislation throughout the country does not of itself assure uniformity of enforcement. For promoting excellent and uniform enforcement the Public Health Service developed a milk shed rating method for the periodic measurement of the control work of municipalities by the state milk control authorities. This is described in *Reprint No. 1970* from the *Public Health Reports*. Many states have been making such ratings for years and submitting them for the purpose of publishing periodically in *Public Health Reports* a list of the communities achieving high ratings. The publication of this list has greatly stimulated good enforcement and has acquainted cities experiencing a milk shortage with areas from which satisfactory supplies can be obtained. Occasional standardization ratings by the Public Health Service reveal whether the rating methods of the shipping state are acceptable. By this system a receiving community is afforded all necessary and legitimate public health protection of its distant sources of supply. It is offered as a means for overcoming existing trade barriers and duplication of inspection.

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2. *Pub. Health Bull. 245*, 1939, p. 56.
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Engineering Problems in the Use of Glycol Vapors for Air Sterilization*†

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NONE of the various methods which has been proposed for reducing the incidence of respiratory diseases has ever been found completely effective. Immunizing sera and vaccines have been of great value but the need of further measures is apparent. From the time of Lister's early experiment with phenol sprays, many investigators have attempted to bring about reduction in the bacterial content of air by chemical agents. Until the last few years, however, satisfactory materials to accomplish this have not been available. The ideal substance is one which would be non-toxic, odorless, imperceptible to the occupants, effective in very small concentrations, easy to distribute, and reasonable in cost. Certain of the glycols, i.e., propylene and triethylene appear to fulfil most of these requirements. They are non-toxic, essentially odorless, available, reasonable in cost, and their bactericidal action is dramatic in its effectiveness.[1] Until the low toxicity of these substances was established, large scale investigation could not be carried forward. The work of Robertson[2] and his coworkers has demonstrated that triethylene glycol (TEG) and propylene glycol (PG) are non-toxic, even in much greater concentrations than those which are required for effective bactericidal action for air sterilization.

Numerous tests have given evidence that effective killing of air-borne bacteria and viruses is accomplished by either TEG or PG vapor.[3, 4] Since practically all prior work had been done in small test chambers, it was evident that before full utilization of these glycols material could be possible and controlled studies of their effect in the reduction of cross-infections could be carried out, experimentation in full-scale chambers and with actual living groups had to be made.

We have shown that in our experimental room (10,000 cu. ft.) concentration of TEG ranging from 0.003 to 0.005 milligrams per liter (0.0013 to 0.0022 grains per cu. ft.) bring about instantaneous killing of bacteria sprayed into the space (Figure 1). Similar results are obtained with concentrations of 0.1 to 0.2 mg. per liter (0.044 to 0.088 gr. per cu. ft.) using PG.[5] A humidity of 35–45 per cent should be present to insure optimum effectiveness. Our tests have shown that bactericidal activity occurs exactly as had been demonstrated in the previous small chamber experiments.

The next phase of our study was concerned with the development of the

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† The work described was done under contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Northwestern University.

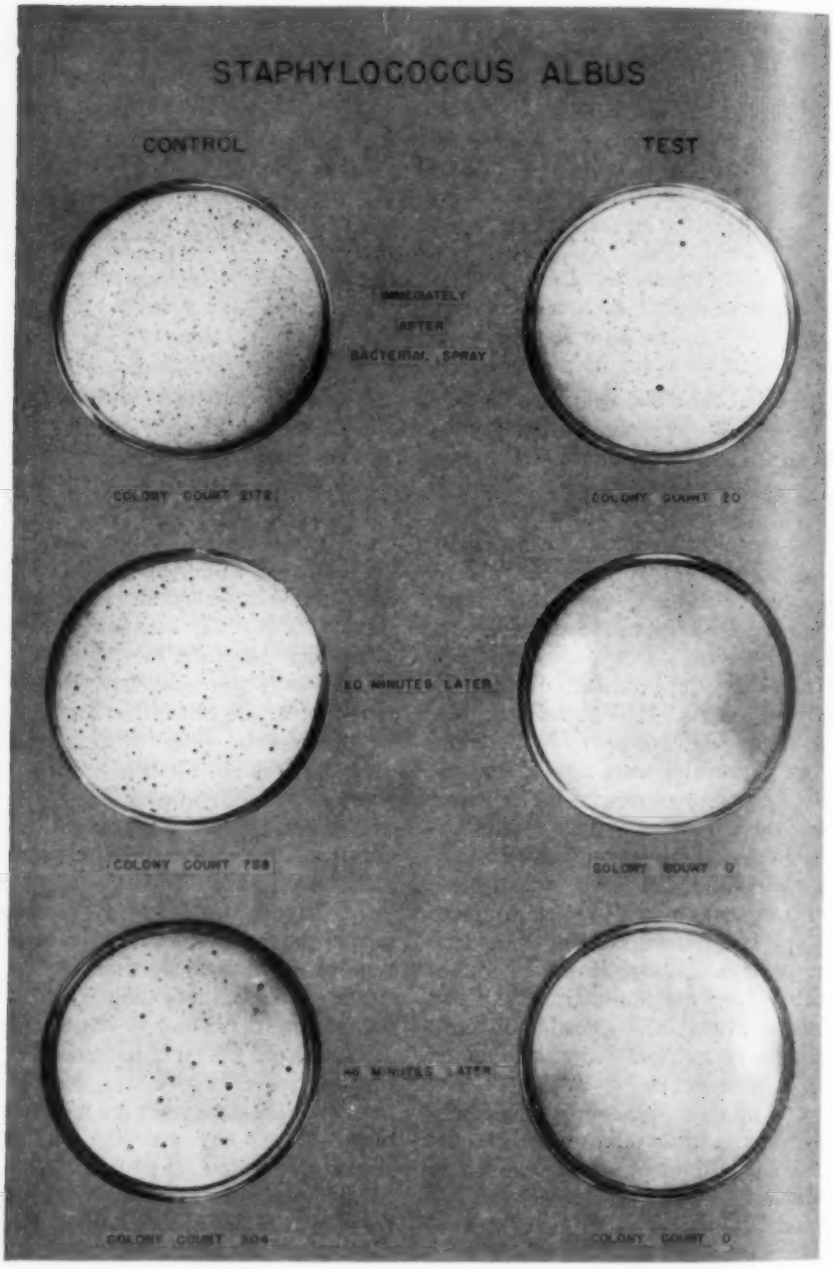

FIGURE 1—Bacterial plates showing the number of organisms per cu. ft. recovered after spraying an equal quantity of a standardized suspension of *Staphylococcus albus*. The room humidities were 45 per cent and the triethylene glycol concentration in the test was 0.004 mg. per liter.

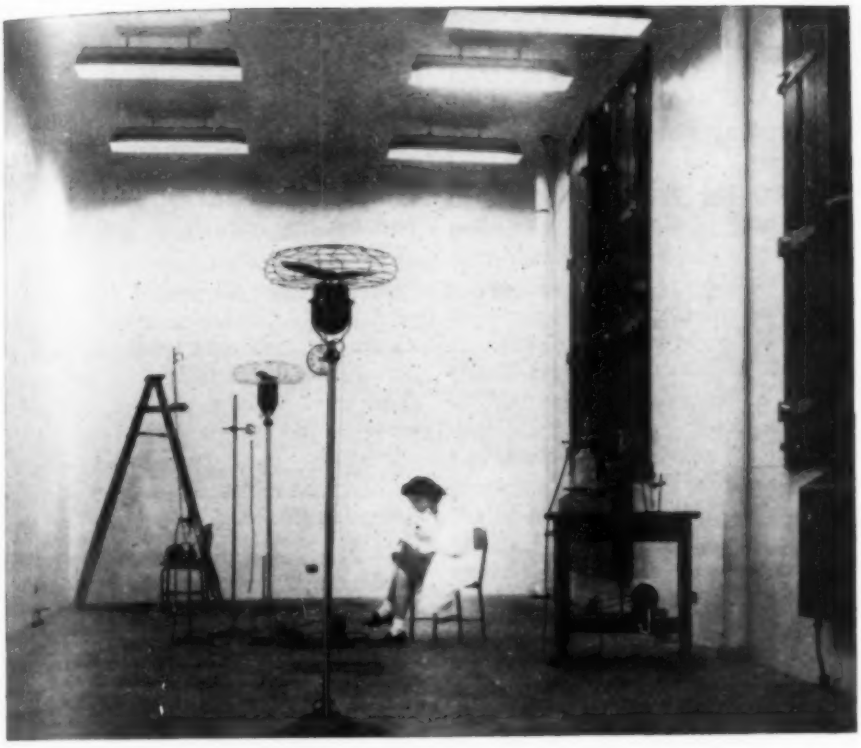

FIGURE 2—Test room showing apparatus for the introduction of bacteria and for air samples of glycol and organisms

engineering data required for the application of the glycols as bactericidal agents for occupied spaces.

TEST LOCATION

These tests were started at the Technological Institute, Northwestern University, in July, 1942. Use in particular was made of the large air conditioned test room of the Institute (Figure 2). This room is 38 ft. long, 17 ft. wide and 16 ft. high, and has an approximate volume of 10,000 cu. ft. It was insulated and extremely tight in regard to air infiltration or exfiltration. Large refrigerator type doors were used for entry and over each of the windows. This made it possible to observe the action of the glycol supply without having to consider large quantities of uncontrolled air. This room was connected to a complete air conditioning system, such that its temperature could be varied from $-20°$ F. to $+140°$ F., and its humidity controlled. In the tests up to the present, it has not been found necessary to operate the air conditioning system.

SIGNIFICANT PHYSICAL PROPERTIES OF PROPYLENE AND TRIETHYLENE GLYCOL

Careful studies were made in order to ascertain the concentration of propylene glycol or triethylene glycol in equilibrium with air of a given humidity. These data are fundamental to the entire problem of the use of glycol vapor in air spaces. From such observations one may determine how great

or small a quantity of glycol and water vapor may be held in air at given temperatures and humidities, at what point condensation would be expected to occur, and at what point perceptible fog appears. Furthermore, as will later be shown, the final development of a practical "air-glycol atomizing scrubber" will depend upon a knowledge of these values.

As shown in Figure 3, preliminary data have been obtained. These data are being restudied, using both PG and TEG, by more precise technics so that more accurate values will be available. It may be seen, however, that at an arbitrary temperature, i.e., 70.5° F., the vaporization of water-propylene glycol solutions results in constant concentrations of water and glycol vapor in the air. Thus with high relative humidities it will probably be impossible to maintain a consistently high glycol concentration in its vapor phase.

Before tests in living spaces could be attempted, the inflammability characteristics of propylene and triethylene glycol were studied intensively.[6] Our observations, in brief, showed that:

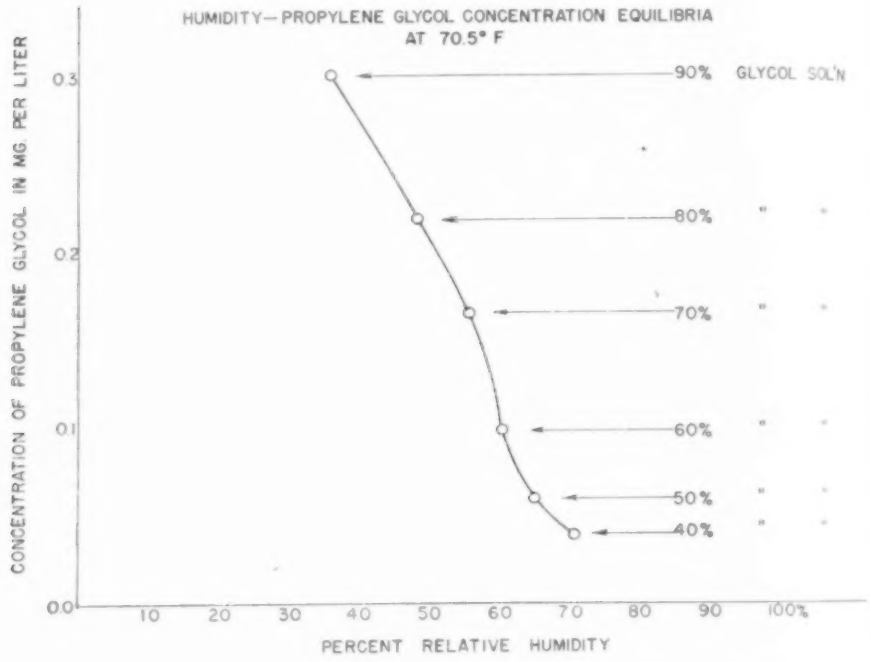

FIGURE 3—Curve showing quantities of propylene glycol and water in equilibrium at a temperature of 70.5° F.

1. The vapor-phase concentrations required for air sterilization were completely free of any fire hazard.

2. The presence of water in combination with glycol greatly reduced its combustibility. This was particularly significant, since samples of condensed material from surfaces as cold as —20° F. never contained more than 2 per cent glycol. It is impossible to ignite such solutions even with prolonged application of heat.

3. The introduction of small quantities of water with glycol renders large storage tanks relatively inactive as far as inflammability is concerned.

BEHAVIOR OF GLYCOL VAPOR IN TEST ROOM

Two effective means of generation of glycol vapor were developed and both were used in our experimental room. The first employed an atomizing principle, and the second generated the vapor by heating. Both methods showed that glycol vapor when delivered into the space had little or no tendency to stratify, it diffused readily through the space and, if air exchanges to outside spaces were kept to a minimum, the concentration decreased at a slow rate. There was evidence of a slight amount of absorption on room surfaces.

Since relative humidities of 35 to 45 per cent are desirable, condensation of water and glycol vapor takes place on cold surfaces, such as windows or poorly insulated walls in cold weather. The necessity for the maintenance of 35 to 45 per cent humidity also means that water vapor must be introduced into heated spaces during periods of low humidity, such as exist in winter. It has been found that the addition of water with introduced glycol can easily be made.

APPARATUS FOR GLYCOL GENERATION

As mentioned before, two means of glycol vapor generation were developed. The first utilized atomization of glycol water solutions of automatically controlled concentrations. In this method the solution is sprayed into a large mixing chamber containing a system of baffles to eliminate droplets. Equilibrium takes place between the air passing through the chamber and the sprayed solution. Complete and final data on the operation of this device have not as yet been obtained. However, the glycol water solution produces a definite concentration of glycol and water vapor in the air issuing from the outlet. It may also be seen that if the room air is recirculated through the mixing chamber it will pick up only the difference between its glycol content and the maximum content. The maximum possible glycol content depends on air temperature and on the glycol concentration of the atomized solution. When final details and refinements have been worked out, it will be possible to produce a vapor of constant concentration controlled by the amount and temperature of the air being passed through the atomized mixture and by the concentration of the liquid being sprayed. It should be observed that by fixing the solution concentration, the glycol content in air can never exceed a predetermined maximum at any room temperature. Vaporization of some of the atomized water also contributes to raising the space humidity. This method will probably be most applicable in the case of existing air conditioning systems with duct work in place.

The second type of apparatus developed was one in which water glycol solutions were boiled at constant temperatures. The concentration of the vapor emitted is dependent upon the glycol water concentration of the solution and the rate of production of vapor depends upon the rate of boiling, i.e., rate of heat input. Both the boiling temperature and the concentration in the reservoir can be automatically controlled. Thus, just as in the atomizing (scrubber) device, one can introduce controlled quantities of water vapor in conjunction with controlled quantities of glycol. This apparatus is small, compact, and easily portable so that it offers certain advantages over the first method.

SUGGESTED INSTALLATIONS

Although natural air and convection currents in a space tend to distribute the vapor to a certain degree, it is felt that some means of air agitation is very desirable. In ordinary living spaces of moderate capacity fairly uniform dis-

tribution can be obtained by the use of oscillating fans.

When larger installations are to be made, particularly in large gathering places, such as auditoriums and hospital wards, the use of a duct system plus a blower-type fan seems desirable. In the typical layout of Figure 4 a duct is located near the ceiling and at the center of the room, fitted with outlet grilles to allow uniform escape of glycol laden air. The volume of air to be moved is dependent upon the size of the space and the number of individuals present.

fresh and recirculated air should be accurately controlled by means of dampers.

The ultimate answer to the rate of introduction of glycol vapor and water vapor will, of course, be dependent upon the rate of infiltration and exfiltration of air from outside or adjacent spaces.

MEANS OF DETECTION OF GLYCOL VAPOR

The final apparatus for practical application depends upon the development of a device which will readily detect adequate concentrations of glycol vapor in the treated space. This should

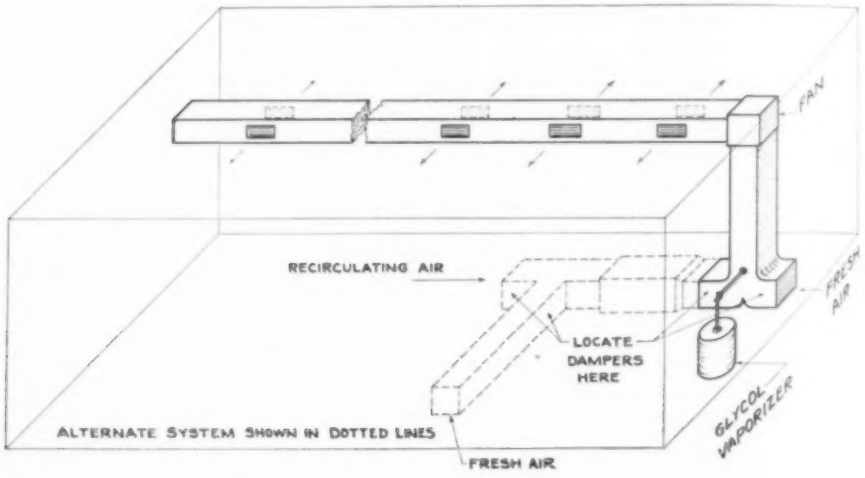

FIGURE 4—Diagrammatic illustration of suggested duct layout for glycol vapor distribution

The two types of glycol generators are shown, the atomizing (scrubber) device being indicated by broken lines. It may be seen that allowance is made for introduction of outside (fresh) air. Thus, all the air to be introduced must pass through or by the incoming glycol vapor and be mixed with it so that only "glycolized air" issues from the outlets in the duct. For best operation the room should be sealed as completely as possible and the relative quantities of

operate in a manner similar to a thermostat, turning the glycol generator off or on in response to variations of glycol concentration in the room. Preliminary studies on several types of such devices are being carried out but none are as yet completely satisfactory. Thus, for our studies in living groups manual operation of the generator will be necessary.

DISCUSSION AND CONCLUSIONS

The data already obtained indicate

that the results secured in the laboratory should be equally applicable in occupied spaces. As yet no conclusions can be drawn as to whether bactericidal concentrations of glycol in the air of living spaces will significantly affect the incidence of cross-infections of air-borne disease. Other factors such as the amount of dust in the air, the proximity of one person to another and the virulence of the infecting agent, all play a rôle in cross-infection. However, one would expect that the presence of a "bactericidal curtain" surrounding each individual would reduce the possibility of that individual transmitting or receiving virulent organisms. Final conclusions must depend upon adequate and well controlled field trials which are now being organized.

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Favorable and Adverse Developments in the School Environment*

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IN a recent bulletin issued by the Committee on Administrative Practice of the American Public Health Association (*Health Practice Indices*) a series of charts are shown indicating the range of accomplishments in various fields of community health service. The material had its origin in the *Evaluation Schedules* submitted for the National Health Honor Roll for the years 1941 and 1942. The health practices summarized in the pamphlet may be assumed to be reasonably indicative of the progress attained in the different health services of some of the more progressive communities.

It is disconcerting, therefore, to note that, of the rural school children served with satisfactory water supplies, the median group still shows a deficiency of almost 20 per cent. As the pamphlet itself indicates "There are all too many areas where rural school children are forced to use unsatisfactory water supplies with their attendant potentialities as sources of water-borne illnesses."

For over one-quarter of the total number of communities surveyed satisfactory water supplies are unavailable to rural school children to the extent of from 35 to 70 per cent of the children involved.

In the case of satisfactory means of excreta disposal, the situation is somewhat better, although in the median group of rural school children approximately 10 per cent are still unprovided with satisfactory excreta disposal facilities. In one-quarter of all of the communities analyzed, unsatisfactory means of excreta disposal are provided for anywhere from 25 to 80 per cent of the rural school children involved.

This none too flattering picture might be excused by some on the score that the situation is much better in the case of urban communities. Unfortunately such data as are at hand do not confirm this optimistic hope. In one community of over a million people, for example, approximately 10 per cent of the school children still have substandard sanitary facilities which would not be acceptable on any appraisal sheet. There is reason to believe that the physical environment of schools, both in rural and urban areas, is typical of the few instances here presented.

We need not blame the war effort for any major adverse developments in the school environment, except in so far as the war has intensified or stressed the obvious deficiencies and has been responsible, of course, for deferring at least some important correctives. Bear-

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ing this fact in mind, therefore, it is important to view the school environment as one which required attention over a long series of peace years rather than one which the contingencies of war have created. A simple explanation of these deficiencies of physical facilities of various schools, both rural and urban, resides in the fact that those interested in the health of children have moved rapidly toward the personal hygiene activities which promise and accomplish so much in lifting the level of the health of the school child. Unfortunately, these efforts have too frequently been founded upon defective underpinning of an environmental type. In other words, advances in medicine and in application of the results of medical research have been so rapid that the purely physical aspects of the school received less attention than 25 years ago, except perhaps in the direction of architectural aesthetics. Corresponding emphases on sanitary control of the school structures were lacking. These lapses are particularly unfortunate since the schoolhouse, from the lowest to the most lavish structure, should be the demonstration center for the education of children in the primary tenets of public health practice.

The best use of the school and its environs for the protection and permanent education of the child still lies in providing therein, not the more expensive, but the most adequate sanitary features which modern technology can provide. This is only loosely accomplished in a community where for many years one of the best places to demonstrate the most insanitary type of drinking fountain was in the most recently constructed public school, where school superintendent, architect, health commissioner, public health nurse, and sanitary engineer apparently were never introduced to each other.

Some people have facetiously referred to many of the newest public schools as the concealed museums of unused air conditioning equipment. Here, too, the art of the salesman has outstripped the efficiency of intercommunications between school and health authorities. No inventory has ever been made of the amount of money invested in air conditioning equipment which has never performed a single revolution in fact since the date of its installation. That there are such, even a modest observer of schoolhouses could disclose.

The protection of the school environment, therefore, in so far as the sanitary engineer is concerned, has shown violent fluctuations from the provision of little or nothing to that which was too expensive and at times unnecessary.

The war has merely stressed these deficiencies and has piled them up. The war is not responsible, however, for the fact that in many expensive as well as inexpensive structures for school children natural and artificial light is poor; that in some vocational schools the conditions in the automobile repair shops are inferior to those which would be permitted in a commercial establishment for the same purpose; that in too many schools for colored children the toilets are dilapidated, lice and fleas infest the school, and the waste from drinking fountains and sinks finds its way comfortably to the nearest street surfaces; that in many of the most modern urban school systems in the country neither towels nor soap are provided for the school children to wash their hands after using toilet facilities, even though health department posters, gracefully designed to instruct the children in these habits, are prominently posted in the various toilets and washrooms.

It did not take a war in 1939 to disclose that hand-washing facilities were virtually absent in the school system of a number of large cities because the cost was considered by the school board to be prohibitive.

In other major cities of the United States, as late as June, 1939, schools for colored children were provided with outside privies, with no seat covers, with the pits not fly tight, and sufficiently odoriferous to be reminiscent of the textbooks of 1900.

It was not war which caused illness, in a large number of students, from fumes and gases in one of our most distinguished school laboratories because of the lack of adequate artificial ventilation, generally demanded under state regulations for industries. Nor was it war that made the classic location of illegal cross-connections in one of the most important high schools of a large city.

These examples are culled from the reports of various school surveys which have or have not found their way into the literature. They are impressive in demonstrating the conviction that long before World War II we had the elements of a major public health war in the field of school environment, in which the antagonists were within the departments of education and of health. This does not mean that equally excellent examples cannot be given of accomplishments and of coöperative effort between the departments of education and of health. There are many such, but the examples of the absence of such positive coöperative effort are still too many to be comforting to either the educator or to the health officer. Since these situations have become intensified because of war and because they will confront all of us in increasing degree as soon as peace is declared, the remainder of this paper will be devoted to outlining some of the elementary features of school environment, the control of which the members of the American Public Health Association may profitably take to heart. Most of these details are probably familiar to all of you. Perhaps they are so familiar that it is reasonable to ignore them even in the installations. In rehearsing them for you some renewed interest may be generated in applying those sanitary standards and practices to the future which have been in the textbooks for many years in the past.

Much of our lifetime is spent in the home, the school, and the work place. Witness the family as they break up after breakfast for the day's work. The father leaves for the office or factory environment, the child for school, and the mother remains in the home. Many of the same fundamental considerations of sanitation apply to each of these environments. In *Preventive Medicine in Modern Practice* (edited by the New York Academy of Medicine) it is suggested that it would be well for experts in the hygiene of housing to participate always in the planning of new schools. It is easy to see how the problems of illumination, ventilation, heating, water supply, sewage disposal, fire hazards, and general housekeeping require the same fundamental engineering considerations, whether applied to the environment of 15,000,000 school children of the country or to the environment of the 50, or 60,000,000 workers.

Of course for a comparatively small percentage of workers exposed to special hazards specific to some manufacturing, mining, and mechanical industrial plants, there are special industrial hygiene problems in the control of dusts, fumes, mists, and gases, and in protection against accidents.

The school environment is planned by architects and engineers and is operated and maintained by the school custodian under the general supervision of principals. To the extent that the architect, custodian, and principal understand and appreciate the requirements of a healthful environment and to that extent only, will the new schools and the major alterations to existing schools be designed and constructed to

promote good and prevent ill health. Improvements and maintenance of existing schools are likewise planned by superintendents, business managers, and other officials of the boards of education. It is important that the school environment be planned to complement the hygiene program of the school and the health department. The problem is both medical and engineering and, where these services are available and interested, the health department can play a very useful and effective part in furnishing understanding and appreciation by translating health objectives into designs and specifications.

The problem of influencing the school board and superintendent is not unlike that of influencing other departments of government in order to accomplish needed improvements. The taxable wealth of the community, the political situation, the progressiveness of the community, and the personalities involved are basic considerations influencing the decision how best to handle the problem.

When Memphis, for example, began to give some thought to a program of school sanitation a few years ago it was found on inquiry that a rather complete course in hygiene had been prepared jointly by a committee of teachers and nurses. Sanitation was not referred to in any way, and the activities of the Bureau of Sanitation were not mentioned. The sanitary engineer had not indicated by any planned activity in the schools any interest in the school environment as a whole beyond that of restaurant inspection and of checking connections to public water and sewerage systems. A first move was to survey all of the schools of the city. A form was developed for reviewing each schoolroom and for scoring each school building from the standpoint of design, construction, and equipment, as part I, and maintenance, operation, and educational effort, as part II. Because of the variation in the illumination found in individual rooms and the many factors involved in providing satisfactory illumination, it was necessary to record these items for each room on a separate sheet.

As the survey progressed the superintendent of schools was acquainted with the results and he became much interested in the information which was being developed. A summary of scores for the first 23 schools surveyed was prepared and submitted. This was the health department's estimate of how the various schools compared with each other and where improvements were needed. This estimate could be compared with their own evaluations. A program of improvements was made up each year, and money was set aside for them in the budget. The superintendent asked that the business manager of the board be kept informed of the progress made and that all reports and plans be filed in his office. The business manager expressed considerable interest, and asked that specifications for drinking fountains to meet the health department's approval be drawn to guide him in the purchase of about 1,000 nozzles for replacements for the next year. Soon a request came from the architect that tentative plans for a new school be looked over for criticism and recommendations before final plans were drawn. This was done, and recommendations were incorporated in the final plans.

This brief statement of experience in one city is included only to indicate how quickly confidence and coöperative effort may be established. Sound engineering advice is appreciated and will command respect. It is frequently suggested in connection with schools, housing, water supply problems, etc., that "the health officer should advise the appropriate officials on matters concerning public health." Unless backed by study and a knowledge of the

principles involved, such advice is not specific enough and frequently is overlooked until too late to mean much. Plans submitted after construction has gotten under way or even after the plans are complete cannot be readily changed. This is just as true for schools as for water supply improvements.

It would serve no useful purpose to list herein the detailed technical features to be covered in school building design and equipment, for these are readily available in current standard texts. It is important, however, to emphasize and reëmphasize that a sound coöperative program between the health and education departments must be based on the respect and confidence of the board of education and on the obvious qualifications and tactfulness of the health officials for dealing with the environmental problems. The minimum necessary steps to provide the satisfactory physical structure and equipment are as follows:

1. Survey of the school plants (master survey)

2. Yearly inspections plus coöperative assistance from the nurse

3. Definite reports and recommendations to be made at the right time in order to receive consideration when the budget is being planned

4. Approval of plans by the public health engineer, in consultation with the school architect

5. Preparation of specifications for sanitary equipment, such as fountains, syphon breakers, dish washing equipment, new lighting systems, etc.

6. Active interest in the educational material used in teaching public health in the school

When peace comes, the school will be revivified. New and delayed structures will be built. Now, however, is the time for the health department to make its joint plans with the school department for the introduction of sound, economical, and safe standards and practices into the school environment. This is one field where simple familiar structures and equipment should not be forgotten because they fail to stir the imagination of the crusader. They do protect lives and safeguard well-being.

Resources of Industry for Health Education*

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INDUSTRY is a vast and complicated machine. Beside it our public health structure has an embryonic simplicity in spite of the miscellany of societies, associations, councils, committees, funds, foundations, institutes, departments, services, and bureaus with which we are familiar. The resources of industry in men, money, and experience are of course enormous, but these must be applied to creating production, jobs and profits. When its resources are applied to health education, that is incidental to its fundamental purposes. Health education is not an end in itself for industry as it is for health educators. In spite of this diversity of approach the two groups can work and have worked together for mutual advantage.

Industry provides organized and reachable groups of people to work with. It spends large sums for advertising, publicity, and promotion, of which millions of dollars are aimed at education of the public in matters of health and sanitation. Health educators in general have been prone to watch industry's health education efforts from afar with scorn, approval, condemnation, criticism, or compliment after the effort has occurred. Seldom have they tried to guide these efforts. On the whole health educators have been quicker to condemn the bad than to accept the good. But the results might more often be good if health educators would take positive, aggressive action to make them so.

For example, I have seen a pamphlet published by a manufacturer of a commodity which every public health worker would agree had unmistakable public health value. The pamphlet had good art work, clear type, an excellent editorial style. Great and expensive talents had gone into the preparation of a piece of educational literature which in attractiveness and effect seldom is equalled by non-commercial publishers. However, in his zeal and ignorance, the manufacturer had made health claims for his product which were not scientifically justified. And, moreover, with a dim consciousness that a health officer might be looking over his shoulder, he failed to stress values of his product that were wholly sound both from selling and educational standpoints. That publication was rejected by health educators. It failed to have its fullest value for the manufacturer. Here was a resource of industry for health education which was wasted both for health education and for industry.

Recently the government in its nutrition campaign has shown in a big way how business resources can be tapped for health education purposes. Millions of business promotion dollars have been spent under the direction of

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the Food Distribution Administration for nutrition education. As a result public funds were conserved, coöperating businesses were flattered by the implied partnership, and the nutritional message reached the people promptly and effectively.

Long ago the Metropolitan Life Insurance Company demonstrated with its Educational Advisory Committee how a business organization can team up with health education for the benefit of itself and the public health.

These are two patterns of coöperation which could be extended to other fields. Other patterns to meet other conditions can be devised. Constructive action of this character is the best antidote for objectionable advertising.

In the last analysis health depends to a very great extent on things which are bought and sold. There is hardly a health education message which is not a promotion for one or more products of industry. For instance—Drink pure water—has meant business for the manufacturers and purveyors of cement, pipe, fixtures, and purification apparatus.

Drink more milk—brought more business and better prices to farmers, breeders, feed producers, dairy equipment suppliers, and even carpenters and masons to build barns and silos. When we insisted on pasteurizing milk, that opened a whole new field of profit. Our laws and regulations on dishwashing in public eating and drinking places if enforced mean more business for the purveyors of soap, detergents, chemicals, hot water heaters, tanks, racks, and laundries.

Furthermore, if industry were not ready to provide the capital and take the business risk involved in producing these essentials for the public health, many of our educational recommendations would be incapable of fulfillment.

Since it is clear that many industries could not exist without the public health program and that public health requirements could not be met without industry, it is hard to understand why such a gulf exists between the two fields. Speaking as a health educator, it seems to me that we should have no hesitancy in requesting an industry to aid us in a program without which that industry might never have come into being. And speaking for industry I see no reason why it should not ask health educators to assist it in health education programs which after all are the educator's chief concern. The Public Health Education Section could most appropriately take the initiative in bringing about such a coördination of effort, which would tap tremendous new resources for health education.

If such collaboration is to take place it may be profitable to examine the organization of industry as it exists for this purpose. There are:

1. The individual manufacturers, producers, processors, and converters with their wholesalers, jobbers, retailers, and distributors—Examples in this class are: General Electric Company, Campbell Soup Company, Lederle Laboratories, and United Fruit Company.

2. The service organizations, including public utilities—Examples in this class are: The American Telephone and Telegraph Company, New York Central Railroad, John Hancock Mutual Life Insurance Company, American Railway Express.

3. The trade associations—Usually these are horizontal combinations of competitive companies in the same field, such as: The American Soap and Glycerine Manufacturers Association, the American Meat Institute, Portland Cement Institute, California Association of Citrus Fruit Growers.

4. Agencies which are especially created by industry groups for research, educational and promotional purposes, such as: The Portland Cement Association, National Dairy Council, the former Cleanliness Institute, and the new Nutrition Foundation.

5. The advertising and publicity agencies employed by industry, among which some of the better known are: Young and Rubicam, J. Walter Thompson, Edward L. Bernays, and Ivy Lee.

In each of these categories there are

many organizations whose business advantage is so closely related to public health progress that there should be little difficulty in quickly developing mutually advantageous coöperative programs.

In the meantime, how can health educators utilize the resources which already exist? Most of us are aware of the availability from industry of a great wealth of pamphlets, posters, movies, and other auditory and visual aids. In spite of the constant efforts of the producers of this material to secure its wider use, the worker in the field often does not know of its existence and at a distance is unable to determine its value for his particular situation. The American Film Center has helped to meet this need in the motion picture field by publication of its annotated list of health films for lay audiences. Until similar compendiums of information on other types of materials are prepared it will be necessary to rely on the information offered from time to time in the magazine *Channels* and in the *American Journal of Public Health*. Unfortunately there is no central agency which continuously makes it its business to see and evaluate health education materials. Nevertheless most of the large national voluntary agencies, including the National Health Library, can usually give some information on resources or suggest other points of inquiry. Undoubtedly the best single source of information is the National Publicity Council and its regular exhibits at the A.P.H.A. meetings. Its information relates to materials from all sources, including industry. It must be remembered, however, that in all information received from such central sources, there has been a conscious or unconscious evaluation of the material in question by the individual who answers the inquiry. This usually makes it desirable to secure information from several sources, and necessary to interpret recommendations (which may be conflicting) on the basis of one's own judgment and knowledge of the conditions under which the material is to be used. The time does not seem ripe for developing a "Seal of Acceptance" for health education materials, such as exists for drugs, foods, and therapeutic devices. In the meantime, Dr. Bauer, Dr. Galdston, and others [1, 2, 3] have suggested certain broad criteria to guide us in the selection of material.

In addition to the *materials* which industry can furnish us for our use we should not overlook the fact that industry also offers great groups of men and women to work with. These groups are organized and reachable. Many big industries have developed their own programs of health education, though these have frequently been limited to safety education. Organized labor also has a growing interest in health education. But a great opportunity still exists for health educators to broaden the safety message into a general health message and to work with large and small groups of workers in the same way that they have learned to work with other organized and reachable groups.

Although industry offers materials for our use and groups that we can reach, it has another resource of far greater potential value than either of these. This is its advertising in newspapers, magazines, radio, and elsewhere. Use of the health appeal in advertising is not new. The following about a then popular dentifrice is from *Peterson's Ladies National Magazine* for 1877:

> Among all the disagreeable consequences that follow the decay of the teeth, an impure breath must be the most mortifying and unpleasant to its possessor, and it is the most inexcusable and offensive in society; and yet the cause of it may easily be removed by cleansing your teeth daily with that justly popular dentifrice, Fragrant SOZODONT. It purifies and sweetens the breath, cools and refreshes the mouth, hardens the gums, and

gives a pearl-like appearance to the teeth. GENTLEMEN WHO INDULGE IN SMOKING should cleanse their teeth with SOZODONT, as it removes all unpleasant odors of the weed. Sold by all Druggists.

Because of claims like this and others which were not well founded, health educators have been justified in their skeptical view of much of the material relating to health which has commercial sponsorship. But many changes have occurred since 1877. Fifty years later *Better Times*[4] editorialized on the excellence of the campaigns and materials which were then emanating from commercial groups. Since then Dr. Bauer and others have pointed out that advertising is not necessarily bad health education just because it is advertising.

Nevertheless, I think all here will agree that much of the present-day advertising is still somewhat less than perfect from the health education standpoint. As far as health education is concerned, it is a resource that is frequently going to waste, if not worse. One might overlook this waste if it were not so tremendous.

To us who are accustomed to modest budgets its size is truly staggering. A quick review of the ten magazines of largest circulation for the month of September, 1943 (counting only one issue of each weekly) indicates that approximately half of all advertising stressed or featured health in one way or another. These ten magazines had a gross circulation of approximately 32½ million copies. The first twenty have a gross circulation of more than 50 million copies. Assuming two readers for every copy, which advertisers consider a small estimate, and counting the weekly publications four or five times a month, the gross readership of twenty leading national magazines is better than 150 million a month. When one adds to that the impact of hundreds of lesser publications (including the pulp magazines), newspapers, radio, car cards, billboards and other mass media, it is obvious that through advertising, the equivalent of every person in the United States is reached not only once, but many times a month. And even if we do not extend our computation for the ten largest magazines in which half of this advertising deals with health, we still have a minimum audience of 60 million people every month in the year. No one will doubt that this is considerably more than the combined total reached by all of our official and voluntary agencies through all of their channels.

September is not one of the biggest advertising months, and the war theme which runs through much advertising today serves to curtail the amount of health advertising. Nevertheless, some 2½ million dollars was spent on health advertising in this one month (again counting weeklies only once) in just ten magazines. This is at the rate of 30 million dollars a year. What the annual figure would be if one included all magazines as well as other advertising media I have not computed. These figures are enough to indicate however that the impact of advertising is, to put it mildly, somewhat greater than the impact of professional health education. Elsewhere I have commented on this comparison and raised the question whether health educators or advertisers are going to do the job of health educators.[5] If anyone believes that the impact of advertising is merely massive and not effective, consider the wide use of laxatives against the recommendation of the medical profession. I suspect that even in this group more of us drink orange juice for breakfast because of what we saw in the advertisements than because of what we read in the textbook. Here, then, is the greatest single resource of industry for health education and it is being used largely without our help and often without our blessing. It constitutes our biggest challenge

today. We must look for a way to use this resource for a healthier nation.

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Dr. Cumming Receives the William Freeman Snow Award

The American Social Hygiene Association has announced the recent award to Hugh Smith Cumming, M.D., Director of the Pan American Sanitary Bureau, Washington, former Surgeon General of the U. S. Public Health Service, of the William Freeman Snow Award for distinguished service to humanity. The award was presented in recognition of Dr. Cumming's 50 years of public health service, during the entire period of which he has been identified with the U. S. Public Health Service.

Dr. Cumming is a graduate in medicine of the University of Virginia in 1893, and has received honorary degrees from the University of Pennsylvania in 1930, and from Yale in 1933. He served as Surgeon General of the U. S. Public Health Service 1920–1936. He has been Director of the Pan American Sanitary Bureau since its organization in 1920 and has been a member of the Health Committee, League of Nations, since its creation and Vice-President since 1937. Dr. Cumming served as President of the American Public Health Association in 1931.

Modern Malaria Control*

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THE word "modern" in the title of this paper is almost superflous because all technical malaria control practices are relatively new. Herms and Gray, the authors of the modern text on the subject, were both prominently identified with the first anti-malarial mosquito campaigns in the United States as recently as 1910.

To the engineer malaria control measures involve the mechanics of reducing exposure of the human host to the potent vectors of the disease. This is accomplished by controlling production of the vectors through attack on the aquatic stages, segregation by mosquito proofing, house spraying to destroy the adult engorged female anopheline, and the use of repellents. Chemotherapy and prophylaxis by drugs are excluded as control media. In reference to this, a recent release from a national committee on tropical diseases states in part:

> Malaria infection rates have never been controlled by drugs. If malaria control is the proposed purpose of suppressive treatment, then it is not advisable. . . . Wholesale suppressive treatment would only serve to increase the number of sub-clinical cases. It is much better to let attacks become apparent through frank paroxysm and then give full therapeutic medication. . . .

Pending discovery of a drug or a biological preparation harmless to human beings and completely efficient in destroying the parasites in the blood, the control of mosquito vectors remains the most effective means of reducing the infection rate.

Undoubtedly, the easiest method of malaria control is by the depopulation of an area. Where malaria is hyperendemic, this is apt to be the natural course of events as the birth rate invariably falls below the death rate. Many peoples in highly endemic areas have learned by experience, folklore, or tribal taboo to depopulate certain areas during that portion of the year when transmission is probable. The hillmen of the Burma Road country depopulate the valleys at night during the warm parts of the year, thereby remaining a relatively healthy, vigorous race as compared with the malaria-ridden tribes of the lowlands. The Tennessee Valley Authority, a leader in modern malaria control practices, has used with success the general principles of depopulation. For example, in certain areas where the control of the malaria vector is economically infeasible, "night leases" are negotiated which permit land utilization during daylight hours but forbid trespassing by night.

Basically the technics of controlling production of mosquitoes have changed but little. Larviciding, filling and draining of standing water remain the cardinal principles involved, but refinements have made our present-day procedures more efficient and economical.

The first break in the old practice of

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using any available petroleum oil as a larvicide was the recognition and adoption of oils having known toxicity, satisfactory spreading qualities, and a degree of volatility that would assure some hours of maintenance. Determination of these qualities can be made in the field with very simple equipment.

In 1921 Barber and Hayne published their trials with Paris green as a dust applied to the water surface to kill anopheline larvae. King and Bradley adapted the method to airplane dusting in 1925. Pyrethrum was introduced in an oil emulsion by Ginsberg for special uses.

Present war needs and the attendant threat of oil and Paris green shortages have accelerated the search for a more perfect larvicide. Within the last few weeks there have been enthusiastic reports on a new insecticide. According to preliminary reports application of unbelievably small amounts of this material effect control which persists for a period of time much longer than that obtainable by use of our present-day insecticides. One report, which smacks of facetiousness, records the destruction of anopheline larvae in a control pool by the inadvertent passage from a treated pool to the control pool of a flock of ducks.

It is almost axiomatic that all new insecticides make their initial appearance heralded by the statement that here at last is an "insecticide to end all insecticides." Time records few of them, however, that do not develop insurmountable obstacles to their effective use. Let us hope that this particular one is an exception. If it will accomplish one-half of what is now claimed for it, it may well prove to be one of the outstanding salvage values of the war.

Draining and filling as applied to mosquito control are engineering practices that change as little as the laws of hydraulics. In the main, antimalarial drainage proceeds through three stages:

1. Temporary ditching to draw off surplus water so that the terrain may be worked
2. Semi-permanent ditches, excavated to grade, sloped, smoothed, and otherwise made adequate for immediate mosquito control purposes but requiring annual maintenance
3. Permanent structures such as concrete inverts, lined ditches, and underground drains

For installations in endemic areas the ultimate, and eventually the most economical, solution is the permanent type of construction. However, for emergency work or for areas of doubtful permanency such construction may not be justified. For the same energy much more semi-permanent work can be achieved. Further, where the balance between transmission and non-transmission is slight, as is often the case in areas of low endemicity, the construction of semi-permanent ditches is all that is needed to overbalance the scales in favor of non-transmission.

In impoundments the full development and practice of cyclic water level fluctuation has been a notable factor of recent years. For smaller impoundments automatic syphons have been used with success.

One of the most progressive improvements in malaria control practice has been the introduction of species sanitation. Formerly control of malaria mosquito production was largely by general mosquito control. The procedures established in the last war constituted one step in advance in that they prescribed the drainage only of standing water which produced anopheline mosquitoes. Today we have rather firmly established the point that in continental United States, out of the twelve species of the genus *Anopheles* capable of transmitting malaria in laboratory trials, only three—*A. quadrimaculatus* in the East, *A. freeborni* in the West, and *A. albimanus* in the Rio Grande Valley, are found to be significant vectors. With this information as a guide,

the present mosquito control team consisting of an engineer and entomologist can survey an area and eliminate from further consideration great acreages of standing water that would have been included previously in control operations.

Particularly striking in this respect are the enormous expanses of cypress swamps in which breeding of *A. crucians* is intensive throughout their extent, but in which *A. quadrimaculatus* occurs only in trifling numbers. The latter can be controlled by dusting or spraying the sunlit edges where this species may reproduce. The economy of this practice becomes immediately obvious. I might here interpolate, with due humility, that the engineering profession has gradually accepted the entomologist in an associated partnership. The history of the present emergency control program should firmly establish the entomological malariologist as an essential entity of the modern malaria control team.

As you know, malaria transmission is dependent on simultaneous occurrence of human cases of the disease and potent anopheline vectors. Malaria vectors occur in practically every state in the union. Also, it is probable, particularly with the dislocation of populations by movements of armed forces and migrations of war workers, that human malaria carriers have been widely scattered throughout the nation. However, there has resulted, as yet, no noticeable extension of the endemic centers of malaria.

The reason for this is found in a third factor which must be present in order to produce endemic malaria—the proper "ecologic niche." This properly vague factor is a combination of natural and man-made circumstances. If favorable, these circumstances help to overcome the mathematical odds against transmission. If unfavorable, they lengthen the odds and make transmission more difficult to the point where it approaches mathematical improbability.

A review of a simple case may help to illustrate the importance of this point. Malaria is a disease of warm countries. Its distribution makes this obvious; the optimum temperatures for the development of the parasite in the body of the mosquito, ranging from 71°–86° F. depending on the species of *Plasmodium*, confirms the point. With the same combination of mosquitoes and human carriers, the parasite is going to have a much smaller chance of striking favorable temperature conditions for its development in mosquitoes in northern Michigan than in southern Georgia. If, in addition to the unfavorable temperature, the few parasites that are ingested in warm, favorable periods of weather find themselves in the bodies of mosquitoes that inhabit well screened communities, the chances are that the parasite will be pumped into oblivion in the blood stream of non-human hosts.

From this it is apparent that as the natural environment for the propagation of mosquito vectors and the malarial parasites approach optimum conditions, the more stringent must be the artificial protective devices. Conversely, of course, the more unfavorable the natural conditions, the greater will be the effect of small expenditures of time and effort on malaria mosquito control or protective devices.

Herein probably lies the reason why endemic malaria is now largely confined to the southeastern portion of the United States, with the exception of a few isolated areas such as the valleys of California, Oregon, and New Mexico. In some cases, conscious mosquito control operations have hastened the decline of malaria in the regions outside the present endemic areas. In the main, however, these areas have "outgrown" their malaria unconsciously through screening, agricultural drainage or

reclamation, improved housing, and intensified use of the land.

In endemic areas these incidental measures do not interpose sufficiently adequate hurdles to prevent continued transmission and we must resort to control measures specifically designed to meet the needs of the situation.

Up until the last war the Cuban and Panamanian demonstrations were not applied to any extent in this country. A decided impetus was given to interest in anti-malaria measures at the community level by the program executed in extra-military zones during 1917 and 1918. This U. S. Public Health Service program extended to 43 areas in 15 states over a total area of about 1,200 square miles. It demonstrated the values accrued, and trained a relatively large group of technical workers for civilian employment in this field.

Since 1918 there has been a progressive strengthening of antimalaria organizations in the southeastern states. The annual number of cases has steadily declined as control efforts and improved living conditions have removed the disease from the cities and larger towns and from many smaller communities. Thus have been removed the worst foci of infection from which malaria spreads epidemically during that part of its biological cycle when its virulence and intensity are increasing.

The secondary impetus furnished malaria control by the various works relief programs in the "thirties" doubtless aided the recession of endemic areas. During this period over 86,000 miles of drainage ditches were constructed in the southeastern United States. With man power and materials of little consequence, the prime objective of the time was the elimination of breeding areas by antimosquito drainage.

The advent of the present war emergency, with the concentrations of military and industrial mobilization in malarious areas, necessitated antimalarial measures to prevent the expected cyclic rise of the disease. This program, Malaria Control in War Areas, a joint undertaking of the U. S. Public Health Service and the several state health departments, is designed to control production of malaria mosquitoes and reduce potential malaria transmission in extra-cantonment zones of military and essential war industrial areas. It is emergency malaria control; a program of preventive medicine. The guiding policy is to provide effective protection with a minimum expenditure of man power and material.

The program complements similar activities of military authorities within the reservation limits. At present, control operations are carried out at 1,200 war establishments located in 22 states, the District of Columbia, and Puerto Rico. In the past year, 13,000 acres were cleared for larvicidal operations, about 5,000 miles of ditches were cleaned, and over 5,000 acres of breeding surface were eliminated by 1,100 miles of drainage. Over 12,000 lineal feet of ditches were lined with durable materials. About 7,000 lineal feet of underground drainage was installed. In this construction one-half million pounds of dynamite were used, as well as draglines, bulldozers, and other power equipment. In the larvicidal operations, airplane dusting, together with heavy power equipment mounted on boats and trucks, aided in conserving man power.

Full advantage is taken of entomological science and the practice of species sanitation. In many areas entomological surveillance replaced costly control operations.

As yet little public information is available on malaria control methods as practised by the armed forces under combat conditions. A review of war theaters leaves little doubt that malaria is the number one disease confronting

our military leaders. The history of malaria in World War 2 will make interesting reading.

The extensive antimosquito drainage of the "thirties," the highly scientific emergency program at present, together with the military experience abroad, should provide the background from which will emerge modern malaria control as a true science. Fundamentals are well established; the overall prospectus is clear. It remains only for competent leadership in the medical, entomological, and engineering professions to translate these fundamentals into practice. The cardinal principles of modern malaria control will be an associated partnership of these three sciences, full development of species sanitation, intelligent integration of basic control principles into modern developments, recognition of conservation interests, and full use of educational media to stimulate individual and community effort. The day of the amateur malariologist will be past. Malaria control no longer will be simply "pouring of oil" or "digging of ditches." It will consist of highly trained men working in a coördinated and supervised organization. Eradication of *Anopheles gambiae* in Brazil has demonstrated the effectiveness of an efficient organization.

It may well be that the next major challenge to the malariologist in the United States will result from the impact of large numbers of returning troops from malarious areas. Dr. Louis L. Williams, Jr., of the U. S. Public Health Service, has proposed a challenging hypothesis—that of eradicating malaria from continental United States. Dr. Williams proposes an anti-anopheline attack in the persistent endemic areas and the activation of mobile antimalaria units to control the expected explosive outbreaks that are anticipated in those areas outside the endemic foci. More will be heard of this proposal in the near future.

Malaria in humans is a disease. The medical profession must take responsibility for overall leadership. Having determined vector control essential, medical science defines the endemic foci, the entomologist determines the density and breeding areas of the malaria vector; the engineer applies the mechanics of engineering science to accomplish control. Where the related principles of all three sciences are not coördinated there is sacrificed effectiveness or efficiency, or both. The future outlook for malaria prevention is good. Its ultimate eradication from the continent is well within probability. Time will tell what use is made of these opportunities.

The United States Chamber of Commerce Public Health Program*

HOWARD STRONG

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THE United States Chamber of Commerce believes that all businessmen should be, and it knows that many are, interested in national and community health and particularly, of course, in industrial health. The Chamber with its 2,000 organization members, is in a position to stimulate this interest and to secure layman support for the national and local health programs, the major responsibility for which must certainly rest with the federal, state, and local health departments, with the voluntary health agencies, and with the medical profession.

The Chamber of Commerce health program has, of course, certain definite limitations and, I think, definite possibilities. We cannot, nor shall we try to contribute to technical health knowledge. That is the job of the laboratories, the research institutes, the medical and health agencies—public and private—and the medical, dental, and engineering professions. We certainly shall not presume to tell the doctors what to do—they must tell us. But the program, we hope, can contribute materially to the spread of the knowledge which we have and to its application and use—an application which you know better than we, has lagged far behind the usable knowledge and technics which are available.

The Chamber health program is under the supervision of our Health Advisory Council, which is made up of thirty-two outstanding authorities in the medical and health field, with Dr. James S. McLester as General Chairman, Dr. W. G. Smillie, as Chairman of the Community Health Committee, Dr. Leverett D. Bristol, Chairman of the Industrial Health Committee, and Dr. James E. Paullin, Chairman of the Individual Health Committee.† These are men whom you all know, and in whom you have confidence. We realize that our work must be done with and through the U. S. Public Health Service and other federal agencies, the state departments of health, the local health departments and medical societies, and the great voluntary organizations such as the American Public Health Association, the American Medical Association, and many specialized agencies. We shall count on you to keep us within the bounds of professional soundness.

Our major job, then, is to assist in public education and to secure layman support for the activities which you will develop. My experience indicates that too many businessmen and laymen look on community health ac-

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† Dr. Bristol has recently succeeded Dr. McLester as General Chairman, and Dr. Anthony J. Lanza has succeeded Dr. Bristol as Chairman of the Industrial Health Committee.

tivities as an expression of an overdeveloped, and perhaps not fully warranted, professional enthusiasm and the health department as a useful luxury, but not always as a major essential service. We must help to establish the validity of the health program and assist in creating an insistent community demand for the knowledge and services which you, the professional men and women, are in a position to provide.

The American Public Health Association in its declaration of Desirable Minimum Functions and Organization Principles for Health Activities says, "Health departments should be responsive to public demands. The scope and policy of public health work will depend upon the stage of development of medical, sanitary, and related sciences, and upon *the readiness of the public to support their effective use.*" This implies, of course, the existence of such a demand. Cannot the layman's organization be useful in creating this demand on the part of the community, to which most health departments will readily respond if that demand is coupled with the assurance of financial support sufficient to meet it? We must help to create a willingness that tax money shall be spent to supply the services which are available. And cannot such an organization, too, assist in establishing sounder public relations for the health department, a better understanding of its work and its needs, a closer relationship between the citizens and their official medical staff?

The National Chamber health program, as it is developing, seems naturally to fall into two categories.

1. EDUCATION

Printed material, always professionally approved, of course, will be prepared for widespread circulation. This may include a periodical dealing with current health subjects of interest and importance to the layman, for distribution among workers and to homes and citizens generally; timely news releases and articles for newspapers and a variety of house organs and magazines; subject matter for radio and public addresses; and specialized material from authoritative sources, or our digests of such material, for distribution to special audiences. This educational material should cover all major phases of health knowledge and practice, with special emphasis on industrial health, and with particular attention to women in industry and the children of working mothers, nutrition, tuberculosis, and venereal disease, the expansion and support of hospitals and constant effort to strengthen and support local public health services. It must, of course, carry an editorial style and text adapted to the specific levels and audiences which are to be activated. Such an educational program should bring not only a better understanding of ways to sounder health but should help to create a demand and supply the means to provide for the services necessary to realize our objective.

A prospectus outlining this program has been distributed to leaders of public thought throughout the nation and to organization executives.

2. ACTION

It is not enough to create an intelligent understanding. This understanding must be translated into action, particularly at the community level. The modern Chamber of Commerce does not limit its activities to the interests of business alone. It is concerned with every activity which makes for the welfare of the whole community. Hundreds of chambers of commerce have set up health committees, composed of physicians and laymen, which are effective instruments in securing community understanding and backing for the health department and its program, and

which sometimes, it must be added, have been useful in stimulating the health department to undertake a broader field of activity. This phase of the National Chamber program is being directed not only to local chambers of commerce, but to health councils and other community organizations which are or should be interested.

In the development of any community health program, it is our feeling that the first step is to know the facts, to make an inventory of current health activities and needs. The National Health Honor Roll which, for fourteen years, has been conducted by the American Public Health Association and the National Chamber, provides an effective means for such an inventory, with its *Evaluation Schedule* and its analysis supplied to each participant. We hope that the Honor Roll may become less an effort to obtain distinction and the national recognition which goes with it, and with the communities sometimes resting on their laurels when they have obtained a place on the Honor Roll. It should become more a stimulus to aggressive action, with the evaluation schedule and the analysis as guideposts to the next steps which must be taken toward the fulfillment of a well rounded and adequate program. We expect the Honor Roll to be continued as a major project in the Chamber's health program, and with this objective definitely emphasized.

Two methods of approach are being used in this action phase of our program—the shot gun and the rifle. We are sending to all member community organizations, and others as we make contact with them, material which we trust will be definitely helpful in securing local action and in intelligently guiding that action. A booklet outlining practical methods for setting up a community health committee or council and suggesting the major activities which should be included in the program, has been distributed to these organizations. The Committee on Administrative Practice of the American Public Health Association has revised the *Evaluation Schedule* and simplified the procedures to adapt them to wartime pressures. A pamphlet setting forth the procedures, together with entry blanks, has been sent to all member organizations. Special effort is being made to secure wide participation in this activity. A plan for joint medical services for small industries and an industrial medical self-evaluation schedule, prepared by Dr. Leverett D. Bristol and Dr. Anthony Lanza, will be made available to industrial and other employers. A pamphlet on nutrition, with special emphasis on its industrial phases, is under way, and the Council is coöperating with the War Production Board and the War Food Administration in the distribution of effective material in connection with the "Food-Fights-For-Freedom" Campaign.

The first issue of an occasional bulletin emphasizing various aspects of the Community Health Program and reporting actual accomplishments in this field, is being prepared. This will go to organization executives. Other documents are being planned and will be developed as additional needs indicate. These publications are interspersed with individual letters and occasional personal visits. Thus a widespread effort to create a broader community interest in public health is being put forth. This is the shot gun method.

We have felt too that the Chamber can well select certain communities for special service in intensified local programs and use these communities as demonstration areas to serve as an example and inspiration to others. These programs can become foci of infection for extending community health thinking and action to other centers. A group of New England organization

executives has already met to consider this proposal, and several are now making plans for an intensive program. State health departments have agreed to coöperate and give their assistance. Other groups will be called together and we believe that a considerable number of communities can, in this way, be stimulated to increased action. The assistance of a number of national organizations in these local programs has been assured.

The Council is also developing a consulting service to assist communities in solving their special health problems. Technical questions will be referred to members of the Council or to professional organizations and individuals. We believe that we, in the Chamber, can be helpful in this way.

Thus are we using the rifle method, picking out our target and aiming at the bull's eye.

In all of this activity, most certainly, the health of the worker, who is the backbone of our national prosperity, must be emphasized.

Now may I suggest a project which, it seems to me, would stimulate an orderly national and local health program, and upon which I should like to have your thinking.

After many years of effort, as you all know, every state in the Union has passed laws requiring the reporting of vital statistics. As this reporting becomes more complete and efficient, a vast store of statistical information is being accumulated and is proving of inestimable value as a background against which our public health program is being planned and carried forward.

The American Public Health Association has demonstrated the efficacy of an annual evaluation of the health activities of a community with full-time health services, not only as a measure of accomplishment, but as a directive for future action. Is there not some way in which other communities also could enjoy the benefits of this annual appraisal? I am thinking particularly of those communities which do not have full-time health services. May we not look forward to a universal annual or biennial evaluation of the health services of all our community health departments? Such an evaluation would be conducted under the aegis of the state health departments and be brought together by the U. S. Public Health Service or some other central agency, as a measure of current activities and a guide and directive for future action. Perhaps this evaluation would serve as a stimulus to better equipped departments and more extensive public health protection. The significant work of the American Public Health Association in this field could well attain its logical fruition in such a national policy. It would be a long and arduous task, and it is, perhaps, a somewhat idealistic proposal, but I think it well worth serious consideration.

I have outlined an ambitious program and many other activities will develop as we go along. The program cannot be realized immediately, nor can it be realized at all without the guidance and help of you who are carrying the torch in the field of community and industrial health. The Health Advisory Council hopes and believes that we shall have that guidance and help.

Newer Procedures in Laboratory Diagnosis and Therapy in the Control of Bacillary Dysentery*

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THERE has been recently a renewed concern for the acute diarrheal diseases and, concurrently, a substantial advance in the knowledge of these disorders. It is the purpose of this report to review this newer knowledge as related to the problem of control.

GENERAL OBSERVATIONS

Rational control of disease rests upon reliable diagnoses. To obtain these in the diarrheal diseases, a revision is needed of the prevailing concept of the clinical characteristics which warrant a consideration of *Shigella* infections. In our clinical series of 555 proven positive cases, the most frequent manifestation was a "simple diarrhea." The classical bloody mucoid stools were notably infrequent; indeed, these scarcely entered into the clinical picture of Sonne, Schmitz, or mild Flexner infections, and were not a prominent feature in severe Flexner cases. Also the onset was marked quite frequently by a prominent fever but only mild enteric symptoms, suggesting "flu" rather than dysentery. The very name bacillary dysentery accounts for many of the missed diagnoses. A designation referable to etiology and freed of its present misleading clinical implications would be preferable. We therefore use and recommend the name "shigellosis" for all infections due to pathogenic *Shigellae*. Thus shigellosis is to be thought of as a possible, and in many areas as the most probable, diagnosis in the common variety of acute endemic diarrhea and in an uncertain proportion of cases so loosely designated "intestinal flu."

The manifestations of shigellosis vary widely. In the young the illnesses are frequently grave, occasionally fulminating, whereas in older children and adults the disorders are usually mild. Furthermore, in the young, *Shigella* infection ordinarily results in definite illness, while in older children, adolescents, and adults very mild disorders and subclinical infections are much more common than significant clinical disease. Furthermore, regardless of age of the patient or severity of the disease, infection usually persists beyond clinical recovery. The duration of the convalescent carrier state is commonly three to four times that of the total duration of symptoms. For control, due attention must be given to carriers, convalescent and passive, and

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to cases with disturbances of little clinical significance.

Shigellae may be spread in various ways; the relative importance of these must be weighed in formulating control procedures. We found no evidence, in our own experience, which suggested water-borne infection. Milk was notably free of suspicion, since the poor, who suffer most from diarrheal diseases, generally purchase the less expensive canned or dried product. There was some evidence of spread through contaminated food, but this appeared of minor rather than major importance. Where it did occur, usually multiple carriers were found among the food handlers and kitchen helpers. The disease and flies did thrive under similar conditions. Still, cultural evidence suggested that flies rarely harbor viable *Shigellae*. We isolated this organism from flies only once in repeated trials. In contrast we recovered these pathogens with comparative ease from the fingers or from under the finger nails of known cases and carriers. Considering all evidence we are of the opinion that *Shigellae* are transported from group to group through the movement of infected individuals. Within the household and in other groups living together the organisms are most commonly passed from person to person through direct or indirect contact. Among institutional inmates the negative evidence excluding other channels of spread was strikingly clear in several outbreaks. Hence the control of infected individuals (including personal cleanliness) is of much greater importance in the prevention of bacillary dysentery than has been believed.

Explosive epidemics of shigellosis suggesting a common source and single exposure are rare. Ordinarily, an epidemic starts with sporadic infections which gradually become more numerous, the early cases preceding the recognized outbreak by 2 to 4 weeks or more. The total prevalence, which increases gradually, usually reaches a level of between 10 and 33 per cent. Total incidence of primary attacks (clinical and subclinical) in unmodified outbreaks may approach 100 per cent and counting reinfections has gone even beyond this. Clinical cases, which are most numerous early in the outbreak, decline promptly following the peak of the epidemic, but the total prevalence decreases slowly because of persisting convalescent and passive carriers. The duration of an unmodified outbreak is weeks rather than days. Obviously, throughout this prolonged period a rich source for the spread of infection is maintained. The slow evolution of *Shigella* epidemics provides the need and the *opportunity* for the application of control measures.

LABORATORY PROCEDURES

The advances here have resulted in a simplication of bacteriological technics and a marked increase in the reliability of cultural tests. The development and introduction of the highly selective media which grow the enteric pathogens while inhibiting almost all the non-pathogens was of major importance. Earlier we used desoxycholate-citrate agar, now we employ S. S. (Shigella-Salmonella) agar which has grown satisfactorily all strains of *Shigellae* encountered. In the study of known *Shigella* outbreaks this culture medium only is used for primary plating. A heavy fecal inoculation may and should be employed; to obtain this the usual cotton-tipped applicator coated with feces is satisfactory. This makes it convenient and practicable to collect specimens by rectal swabs and to inoculate the plate directly by "painting" the entire surface of the agar with the swab. The device for taking the rectal swab which we recommend is a small rubber tube large enough to contain the cotton-tipped applicator. The

distal end is cut on a bevel and its external surface is lubricated before use. The applicator alone can be used for infants; in adults, also it may be inserted with little discomfort if the cotton tip is moist. The collection of fecal material for culture by this method involves only the skill required in taking rectal temperatures. The whole procedure is so simple that the responsibility for obtaining and plating of cultures can be entrusted (following instruction and demonstration) to a nurse, attendant, or technician.

This procedure opens a new approach to control. It is now practicable to culture large numbers of individuals for the identification of carriers of *Shigellae*. The plates, prepared and numbered, the sterile swabs, lubricant, and record sheets are taken from the laboratory to the group to be cultured. There the responsibility is divided, one person taking the swabs, a second inoculating plates, a third writing names and culture numbers, and one or more preparing the patients. When the latter are ambulatory, cultures are taken at one place, the patients coming in line, bending over while the swab is being obtained, and leaving by a separate exit. If the work proceeds smoothly, cultures can be taken at about the rate of 200 per hour. It requires more time to handle patients in bed where the materials must be taken from ward to ward. In the presence of an outbreak, the individuals being cultured rarely object, providing the swab is taken by a considerate person of the same sex.

Simplified steps recommended for a prompt and reliable identification of pathogenic *Shigellae* in an identified outbreak are as follows:

Suspicious colonies are picked to Kligler's iron agar (Russell's double or Krumwiede's triple sugar agar is satisfactory also). Despite the heavy fecal inoculum on the plate a high percentage of pure cultures are obtained if the suspicious colony is touched only at its elevated center without "scooping."

Organisms "positive" for *Shigellae* on this medium are directly inoculated to three sugars, mannitol, xylose, and rhamnose. A needle is used and dipped in succession into the three tubes. The fermentation reaction after 24 hours' incubation differentiates organisms found in this country as follows:

	Mannitol	*Xylose*	*Rhamnose*
Flexner (including Boyd's 88)	+	−	−
Sonne	+	−	+
Schmitz	−	−	+
Alkalescens	+	+	−

Tube agglutination tests are also set up immediately using growth from the Kligler's slants. Three diagnostic sera are employed, polyvalent Flexner (including Boyd's 88), Sonne, and Schmitz. A supply adequate for several days is diluted to one or at most two dilutions below the titer of the anti-serum. One-half or 1 ml. of this is added to small test tubes. Using a needle, a small amount of growth from the slant is transferred to the tube and is readily brought into a smooth suspension. If the probable variety of the organism is known, only one tube is needed; if not, Flexner and Sonne are both used. Except in outbreaks, Schmitz anti-serum is employed only when indicated by the sugar reactions since this organism is rarely found in endemic cases. Positive agglutination tests may be recorded and reported after 2 to 4 hours in the water bath, but negative readings are delayed till the following morning. For examinations under the conditions stated these simplified tests reliably identify most suspicious organisms isolated. For the few which are neither clearly negative or positive more extensive cultural tests are used. Further procedures are re-

quired when other pathogens, as *Salmonellae*, may be involved.

Enteric bacteriology in the past was difficult, time consuming and often unproductive. That situation no longer holds true. Culturing for *Shigellae* is now one of the simpler laboratory procedures and these tests may be done in substantial numbers when needed, provided the laboratory is not far removed from the individuals to be examined.

THERAPY

Attention is limited in this study to the use of sulfonamides in shigellosis.

The following method has been used in evaluating the relative efficacy of different sulfonamides in *Shigella* infections. Cultures were obtained before treatment and at daily intervals after the beginning of medication. All were taken by rectal swabs and S. S. agar plates were inoculated immediately in a uniform manner. The number of clear suspicious colonies per plate was counted (or estimated) and representative types picked for identification. Medication was dispensed in individual boxes or envelopes bearing the patient's name and directions as to dosage. Treatment was continued until at least two consecutive daily cultures were negative. Post-treatment follow-up examinations were obtained. Control cases in adequate numbers were similarly followed. Blood counts and urine examinations were ordered twice weekly on some, not on all, to obtain evidence of any minor toxic reactions. Sulfonamide levels in the blood and in fluid feces (following saline laxative) were determined on series of cases receiving the different sulfonamides. Up to the present over 1,500 individuals known to be infected with *Shigellae* (Flexner, Sonne, or Schmitz) when treatment was started, have been studied. In all, ten sulfonamides were used. The major observations were these:

All sulfonamides had some influence in cutting short the duration of these infections.

Flexner strains responded promptly (with very rare exceptions); Schmitz infection was slightly more resistant; while Sonne cases and carriers cleared least satisfactorily.

The poorly absorbed sulfonamides, though given in larger doses, had no demonstrable superiority in effectiveness in Flexner or Schmitz infections and the response was less satisfactory in one regard. The interval between the beginning of medication and a clinical or bacteriological response was longer with the poorly absorbed than with the absorbed preparations.

Sonne infections were more resistant to all sulfonamides. The best results were obtained with large doses of sulfasuxidine. All but a small percentage responded in a little longer time to the absorbed sulfonamides; the resistant cases were handled best by changing to sulfasuxidine.

Toxic reactions were rare (not observed with poorly absorbed sulfonamides) as would be expected with treatment usually terminating in 7 days or less.

Cases and carriers responded equally well to chemotherapy.

Concerning the choice of sulfonamides there need be no rigid rules. Sulfanilamide or sulfapyridine is not recommended. Other absorbed sulfonamides (sulfapyrazine, sulfadiazine, sulfamethazine, sulfamerizine, and sulfathizole) are acceptable. The first appears to have slightly superior properties, the last to be less effective. Among the poorly absorbed compounds, we regard sulfasuxidine as superior to sulfaguanidine and reserve judgment on "sulfathaladine."

We recommend, therefore, that the treatment of shigellosis (cases or carriers) begin with an absorbed sulfonamide. Follow-up cultures should be taken not later than the 4th and again

on the 6th day of treatment. If these or any subsequent two cultures are negative, the individual may be released. If they are positive, and particularly if the organism is "Sonne," a change to sulfasuxidine would be desirable. When cultures cannot be obtained, a treatment of 5 days for Flexner and Schmitz and of 7 days for Sonne is recommended.

A satisfactory dosage for adults for all absorbed sulfonamides is 1 gm.; of sulfaguanidine and sulfasuxidine 5 gm.; and of sulfathaladine 2.5 gm.; all four times daily. Double these amounts may be given as the initial dose. Children (between 25 and 75 lbs.) receive one-half the adult dosage; infants, 0.065 gm. of absorbed sulfonamide per lb. of body weight per day, and proportionately larger amounts of the poorly absorbed compounds. Amounts smaller than the above have been used and found effective in Flexner infections.

APPLICATIONS

The reliable diagnosis of communicable diseases on an etiological basis is an accepted objective in public health practice. The diagnosis of the diarrheal diseases is far below standard since the necessary bacteriological tests are infrequently employed. The simplification of the technic of fecal cultures makes it practicable to recommend that more laboratories and particularly the smaller clinical laboratories be encouraged to make this diagnostic procedure readily available. State health department laboratories would need to give leadership, instruction, and supervision. The agglutinating anti-sera also might be provided, and it could be agreed, if deemed advisable, that all suspicious positive cultures would be sent to the state laboratory for full identification.

The prompt institution of sulfonamide therapy in the young is required to prevent deaths and to speed recovery. However, in older children and adults with the milder clinical disease, chemotherapy has it major importance as a control measure, where it is used to prevent and terminate carrier states.

Early diagnosis and specific therapy are of particular importance when the case is the initial infection in a susceptible group. Adequate attention to such cases and to their contacts is considered of major importance in the prevention of institutional outbreaks. Here we advocate the bacteriological diagnosis of all acute diarrheal disorders which continue for more than 24 hours, or which in the first 24 hours are accompanied by fever or other symptoms. If two or more cases occur within a week in a group having common living quarters, all members of that ward or dormitory should be cultured. Such a program is viewed as practicable when the tests can be done in the institution's own laboratory, or in another one nearby which can function as such.

Kuhns [1] has described a control program for an army service command in which, in addition to strict sanitary measures, he advocates the bacteriological diagnosis of all cases of diarrhea, and the treatment of positive cases and recognized carriers with sulfonamides. Presumably procedures may be modified to meet the varying needs of military medicine.

Though advocating methods designed to aid in the prevention of outbreaks, we recognize that assistance in control is usually requested after the outbreak is well established. Ordinarily on the first survey at least 10 per cent of the group are proved infected, and this percentage may reach 35 as was found in a military unit in Puerto Rico. Under this condition the following procedure has been used repeatedly with satisfactory results:

Infected individuals are identified through the immediate examination of all with symptoms and by cultural

TABLE 1

The Control of Outbreaks of Shigella Infection through the Use of Sulfonamides

Group	Average Population	Variety of Infection	Number of Infected Individuals Found on Cultural Surveys: Days Before Treatment 11–16	7–10	4–6	1–3	Day Treatment Started	Days Following Beginning of Treatment 2–3	4–5	7–8
A	195	Flexner	42	..	55	46.5*	44	16	4	1
B	194	Flexner	32.5*	31	..	26	22	3	3	0
C	188	Flexner	....	23	..	32	28	4	1	0
D	200	Flexner	....	..	..	..	61	18	0	0
E	140	Sonne	....	..	..	22	22	17	11	5
F	70	Sonne	....	..	..	17	15	12	8	4

* Average of two surveys

surveys. All cases are treated with the onset of symptoms and all carriers on identification. Surveys are repeated usually about twice weekly. If practicable, infected individuals are isolated from the group and are treated with sulfonamides until discharged after two consecutive negative cultures. The group is regarded as free of significant infection when no positive individual is found on two successive surveys.

The results of such a program in a military unit have been described by Cornell, Watt, and Dammin.[2] Further illustrative findings are shown in Table 1 (Group A and B). Cases of dysentery began to occur in late March, 1943, among the inmates of two neighboring cottages in an institution for the mentally defective. Clinical cases only were treated at first, while both groups were followed by cultural surveys. From March 29 to April 13 all in Group A were examined 5 times. The prevalence of the infection was at a high level throughout. Then all individuals positive in any of the last three examinations and all additional positives revealed on subsequent surveys were placed on treatment. The prevalence rapidly fell to a low level as shown. However, the first entirely negative survey was on May 13. Group B was handled similarly. From April 4 to 22, clinical cases only were treated and there were five surveys with the findings shown. During this period the prevalence declined moderately. However, after beginning the treatment of all individuals known to be infected, it dropped promptly to a low level. The last positive was found on the 6th day after this procedure was started. In the subsequent 4 weeks, all individuals were culturally negative in each of four surveys. In these and in other groups the occurence of clinical disease was promptly prevented by this control measure. Also a high total prevalence was readily reduced to a low one, but it was frequently difficult and in some groups impossible to attain the goal of complete eradication of the infection.

A second approach to the control of established outbreaks is now under investigation and a progress note is offered. Here sulfonamides are used "prophylactically" or as it might better be described for "mass therapy" with minimal doses of the drug. Heavily infected groups, having a combined population of 1,646 have been observed. On this treatment, as with that described above, there was a prompt reduction to almost complete disappearance of clinical cases. The total prevalence of Flexner infections declined with striking rapidity as is illustrated by Groups C and D in Table 1. Sulfadiazine 1 gm. twice daily was used in the former, sulfapyrazine 0.5 gm. twice daily in the latter. The preva-

lence of Sonne infection under small dosage (1 gm. of poorly absorbed and 0.5 gm. of absorbed sulfonamide twice daily) declined more slowly, though the course of infection in the treated groups was modified favorably. Groups E and F treated with sulfadiazine and sulfapyrazine as above are illustrative. Risks are recognized in this "prophylactic" use of sulfonamides. Resistant strains might be developed which would tend to spread in spite of continued medication. Also, the immediate and remote effect of this dosage on the individual must be examined further. Thus the varied aspects of this simple approach to control require continued critical study.

These newer procedures cannot replace the established methods designed to prevent the spread of fecal pollution. We join in emphasizing the importance of sanitation and personal cleanliness. However, these additional supplementary methods of control are now available and are most applicable where diarrheal diseases are most troublesome, i.e., in institutional groups and military units. They can be used most simply and we believe most effectively in the prevention of outbreaks. The handling of widely distributed epidemics is more difficult because of the amount of laboratory work involved. Here the epidemiologist or administrator will need to evaluate the present and potential gravity of the outbreak and adjust control procedures accordingly.

CONCLUSIONS

1. The requirements for more effective control of *Shigella* infections include reliable diagnoses of mild as well as severe cases, a recognition of the rôle of carriers and more direct attention to the individuals infected.

2. The slow evolution of *Shigella* outbreaks provides the need and the opportunity for the application of control procedures.

3. Laboratory technics for the identification of *Shigellae* have been simplified and increased in reliability.

4. A free use of cultural tests for diagnostic purposes and for the identification of carriers is practicable.

5. Well absorbed sulfonamides, as well as poorly absorbed preparations are effective in *Shigella* infections, and are recommended.

6. Prompt diagnosis and immediate specific treatment of initial cases and early carriers is advocated for the prevention of outbreaks.

7. In the handling of established outbreaks, cases and carriers may be identified through diagnostic tests and cultural surveys and all discovered infected individuals treated till culturally free of *Shigellae*.

8. The merits of "mass therapy" with minimal doses of sulfonamides are not yet securely established.

9. These newer control procedures have a proper place among the methods now available for the prevention of *Shigella* infections, particularly among institutional inmates and in military units.

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The Problem of Falsely Doubtful and Positive Reactions in the Serology of Syphilis*

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AT no time more than at present has the problem of falsely doubtful and positive reactions in the serology of syphilis commanded as much attention and importance. This is not only due to legally required serologic tests before marriage and during pregnancy, but to the testing of thousands upon thousands of selectees for the Army, Navy, and other services, as well as of thousands upon thousands of civilian donors of blood for the preparation of plasma.

However, while doubtful or positive reactions occurring in presumably non-syphilitic individuals are always very disturbing and place a heavy responsibility upon physicians in relation to their clinical interpretation, this present widespread employment of serologic tests for syphilis is not without the great advantage of discovering unsuspected cases of the disease. This in turn usually results in appropriate treatment which is not only of benefit to the individuals concerned, but to the public at large by way of reducing the chances of its transmission to others.

Following the discovery of the Wassermann or complement-fixation and various flocculation tests for syphilis, falsely positive reactions were reported from time to time with practically all methods, not only in a large number of various non-syphilitic diseases of human beings but in presumably normal non-syphilitic individuals as well. But up to about fifteen years ago they were thought to be due largely to technical errors, except in the case of leprosy and malaria. Since then, however, and especially during the past eight years, the results of annual interstate serologic surveys conducted by the U. S. Public Health Service in coöperation with the American Society of Clinical Pathologists, have clearly shown that biologic falsely positive reactions may occur not only in a number of non-syphilitic diseases and conditions but in presumably normal non-syphilitic individuals as well. I refer especially to these serologic surveys because the Committee on Evaluation of Serodiagnostic Tests for Syphilis have not only selected syphilitic and presumably non-syphilitic donors with commendable care and skill, but because all specimens were submitted to various author-serologists themselves in whose laboratories it may be reasonably assumed that technical errors were reduced to a minimum. For these reasons, therefore, I have largely confined myself in this study to an analysis of the results reported by author-serologists and state laboratories in the

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 12, 1943.

TABLE 1

Sources of Technical Falsely Doubtful and Positive Serologic Reactions

(A) Due to Errors in Collection Resulting in Contamination or Hemolysis	*(B) Due to Errors in the Laboratory*
Bacterial contamination	Insufficient skill and experience
Chemical contamination from unclean containers	Failure to follow technic exactly as described by author-serologists
Using oxalate or citrate	Mix-up of specimens
Improper storage of specimens	Improperly prepared glassware
Delay in sending specimens to laboratory	Faulty reagents
Mislabelling of specimens	Inexact measurements
Post-mortem specimens	Inadequate controls
	Improper reading of reactions
	Errors in recording and reporting reactions

nine serologic surveys begun in 1935, including the Washington serology conference held in 1941.

DOUBTFUL REACTIONS

While the committee has adopted the plan of penalizing laboratories one-half point for a doubtful reaction occurring in a presumably non-syphilitic individual and crediting one-half point for a doubtful reaction in the case of a syphilitic individual, in this study I have preferred to list doubtful reactions on the same basis as positive reactions, as was the policy of the committee in the first survey held in 1935. In practice at least it has been my experience that doubtful reactions occurring in presumably non-syphilitic individuals require almost as much consideration from the standpoint of clinical interpretation and management as weakly positive ones, and especially if repeatedly doubtful. Furthermore, while single doubtful reactions should never alone be the basis for the diagnosis of syphilis, neither should they be completely ignored because the disease is unexpected, and especially since they are sometimes the only evidence indicative of possible chronic latent syphilis, either congenital or acquired.

TECHNICAL FALSELY DOUBTFUL AND POSITIVE REACTIONS

Unfortunately there are many sources for falsely doubtful and positive reactions due to technic. As summarized in Table 1, these may be divisible into those incident to the collection of blood resulting in excessive contamination or hemolysis, and thereby usually attributable to the physician himself, and those attributable to faulty technic in the laboratory. Certainly all serologic tests, regardless of their technical simplicity, require skill, experience, and scrupulous attention to all details regardless of how inconsequential they may appear. For this reason the Committee on the Evaluation of Serodiagnostic Tests for Syphilis has always placed proper emphasis on the advisability of technicians conducting the tests exactly as described by their author-serologists. And, needless to state, the incidence of technical falsely doubtful and positive reactions varies according to the skill with which the tests are conducted; consequently, no test can be better than the laboratory conducting it. Under the circumstances it is to be expected that the incidence of falsely doubtful and positive reactions due to errors in technic will increase under present conditions because of the large number of technicians with insufficient training and experience being rushed into serologic testing for syphilis.

But there is another angle to this subject which has not commanded as much attention as it deserves. I refer

to the possibility of technical errors being inherent in the test itself so that falsely doubtful and positive reactions may occur in the hands of skillful and experienced technicians and, indeed, in those of the author-serologist himself. As is well known, every serologic test now employed can be made so sensitive as to yield doubtful or positive reactions with the sera of normal non-syphilitic individuals. In the race for sensitivity in the detection of syphilis author-serologists may commit the error of making their tests too sensitive. For my own part, I always have been and continue to be dedicated to the principle that it is better to reduce technical sensitivity to the level of 100 per cent negative reactions with the sera of normal non-syphilitic individuals even though this inevitably means missing the serological detection of an occasional case of chronic latent syphilis. In other words, I believe that the serologic tests for syphilis should be made technically only as sensitive as is consistent with what may be termed "practical specificity" for syphilis.

Under the circumstances it is not at all easy to determine what percentage of falsely doubtful and positive reactions is due to errors in the collection of blood and the setting up of tests and that due to the tests themselves. But if it may be assumed that in the serologic surveys the tests conducted in the laboratories of author-serologists were set up exactly as they have been described, it is apparent, as shown in Table 2, that under such conditions only one of the ten tests now commonly employed has had, up to the present time, 100 per cent negative reactions in all of the nine serologic surveys with the sera of normal, presumably non-syphilitic, individuals. In this connection, however, I point with pride to the fact that in the 1943 serologic survey all of the author-serologists listed in Table 2 reported 100 per cent negative reactions with the sera of normal, presumably non-syphilitic, individuals.

TABLE 2

Doubtful and Positive Reactions Reported by Author-Serologists with the Sera of Normal Presumably Non-syphilitic Individuals in the Serologic Surveys *

Tests	Total Sera Tested	Doubtful and Positive Reactions	
		No. Sera	Per cent
Eagle Wassermann	850	5	0.6
Eagle macroflocc.	907	13	1.4
Eagle microflocc.	580	11	1.9
Hinton regular	956	5	0.5
Kahn presumptive	967	3	0.3
Kahn standard	1,116	2	0.2
Kline diagnostic	1,116	4	0.4
Kline exclusion	802	8	1.0
Kolmer	1,116	0	0.0
Mazzini slide flocc.	429	1	0.2

* 1935, 1936, 1937, 1938, 1939, 1941, 1942, 1943, and Washington serology conference of 1941

In Tables 3 and 4 it is shown that technical errors alone, apart from those inherent in various complement-fixation and flocculation tests themselves, have apparently occurred in seven of the serologic surveys in a disturbingly large number of state laboratories. Thanks to the excellent efforts of the Committee on the Evaluation of the Serodiagnostic Tests for Syphilis, however, the situation in the last survey (1943) was greatly improved over that of the first, conducted in 1936. For example, in 1935, 50 per cent of state laboratories reported falsely doubtful and positive reactions with various complement-fixation tests, but only 13.4 per cent in 1943 (Table 3). Furthermore, the percentage of these reactions has dropped from between 1.0 and 10.0 per cent in 1936, to between 0.7 and 0.8 per cent in 1943. Somewhat less but nevertheless definite improvement has been observed also in the case of the various flocculation tests (Table 4). Thus, while 67.9 per cent of laboratories reported falsely doubtful and positive reactions in 1936, only 29.7 per cent reported them in 1943. And while the incidence of these reactions varied from 1.0 to 40.0 per cent in 1936, it

TABLE 3

Negative, Doubtful and Positive Complement-fixation Reactions Conducted by Various Methods Reported by State Laboratories with the Sera of Normal Presumably Non-syphilitic Individuals in the Serologic Surveys

Year	Total Labs.	100 Per cent Negative Reactions		Doubtful and Positive Reactions		
		No. Labs.	Per cent Labs.	No. Labs.	Per cent Labs.	Per cent Reactions
1936	22	11	50	11	50	1.0 to 10.0
1937	35	22	63	13	37	0.5 to 8.9
1938	33	23	70	10	30	1.0 to 10.0
1939	26	15	60	11	40	0.9 to 6.0
1941	31	23	74.2	8	25.8	0.8 to 1.5
1942	28	20	71.4	8	28.6	0.8 to 0.9
1943	30	26	86.6	4	13.4	0.7 to 0.8

TABLE 4

Negative, Doubtful and Positive Flocculation Reactions Conducted by Various Methods Reported by State Laboratories with the Sera of Normal Presumably Non-syphilitic Individuals in the Serologic Surveys

Year	Total Labs.	100 Per cent Negative Reactions		Doubtful and Positive Reactions		
		No. Labs.	Per cent Labs.	No. Labs.	Per cent Labs.	Per cent Reactions
1936	28	9	32.1	19	67.9	1.0 to 40.0
1937	39	17	43.3	22	56.7	1.0 to 25.0
1938	62	39	62.9	23	37.1	1.0 to 15.0
1939	51	19	37.3	32	62.7	0.9 to 14.8
1941	56	32	57.1	24	42.9	0.7 to 4.6
1942	72	41	57.0	31	43.0	0.8 to 16.3
1943	74	52	70.3	22	29.7	0.8 to 16.8

dropped to between 0.8 and 16.8 per cent in 1943.

Under the circumstances it is apparent that there is still much room for improvement on the part of some state laboratories if it is assumed that the performance of tests in the laboratories of the author-serologists (Table 2) is acceptable as a measure of the incidence of falsely doubtful and positive reactions with the sera of normal, presumably non-syphilitic, individuals. Fortunately, many state laboratories are conducting serologic surveys themselves as a check on the performance of municipal, hospital, and private laboratories within their confines. I have not sufficient data bearing upon the results observed, but I hazard the opinion that not a few are below the performance of the state laboratories themselves although these intrastate surveys are gradually and progressively improving the situation in a manner analogous to the annual interstate surveys conducted by the Committee on the Evaluation of the Serodiagnostic Tests for Syphilis.

BIOLOGICAL FALSELY DOUBTFUL AND POSITIVE REACTIONS IN NORMAL NON-SYPHILITIC INDIVIDUALS

Biological falsely doubtful and positive reactions are so designated because they are due to the presence of a reagin-like or other substance in the serum (shortly to be discussed), and therefore likely to occur in tests correctly conducted with skill and experience. That this substance may occur in the sera of normal non-syphilitic individuals cannot be denied but the true incidence is still unknown. In 1941 Eagle [1] estimated that with present-day serologic tests the incidence among university students was about 1 for every 4,000 persons tested, and perhaps even less. Mohr and his

colleagues [2] have recently reported 9 normal persons yielding these biologic nonspecific positive reactions.

As previously stated, falsely doubtful and positive reactions with the sera of normal persons may be and doubtless are due in the great majority of instances to technical factors incident to the conduct of the tests or inherent in them. For this reason it is not at all easy to differentiate between those falsely doubtful and positive reactions due to technical factors and those due to the biological factor. In so far as practising physicians are concerned, however, the important matter is the incidence of falsely doubtful and positive reactions due to a summation of these causes. In the 1943 serologic survey about 131 sera were supplied by the committee from normal, presumably non-syphilitic, donors. As previously stated, all of the author-serologists listed in Table 5 reported negative reactions. The same was true of many of the state laboratories participating in the survey but, on the other hand, a few of the latter reported all the way from one doubtful or positive reaction per 100 individuals to as high as one per 6 in the case of a supersensitive flocculation test. I mention these facts because the performance of state laboratories is probably acceptable as a broad and general index of that of laboratories in general. Undoubtedly the great majority and probably all of these falsely doubtful and positive reactions in such a small series of sera were due to technical factors, but the results are sufficient for indicating what physicians may be warned to expect with the serologic tests now commonly employed under what may be regarded as average conditions.

Much less can be stated in regard to falsely doubtful and positive reactions with the cerebrospinal fluids of non-syphilitic individuals. For various reasons it has not been possible for the Committee on the Evaluation of Serodiagnostic Tests for Syphilis to supply them for the annual interstate serologic surveys. In so far as tests conducted by author-serologists themselves are concerned, however, data are available from the 1935 survey and the Washington serology conference held in 1941. These, as summarized in Table 6, indicate that cerebrospinal fluids are much less likely than sera to yield these reactions. Undoubtedly this is due in large part to technical conditions but, on the other hand, it is quite likely that the reagin-like substance that may occur in the sera of normal non-syphilitic individuals yielding falsely doubtful and positive reactions does not occur in the cerebrospinal fluids of normal individuals. At least it is well known that natural antibodies occurring in the sera of normal individuals do not occur in

TABLE 5

Falsely Doubtful and Positive Reactions with Sera Reported by State Laboratories in the 1943 Serologic Survey

Tests	*No. Labs*	*No. Reporting Doubtful Reactions*	*No. Reporting Positive Reactions*	*Per cent Doubtful and Positive Reactions*
Eagle Wassermann	3	0	0	0.0
Eagle macroflocc.	2	1	0	0.8
Eagle microflocc.	2	0	1	0.8
Hinton regular	7	2	3	0.8- 3.2
Kahn presumptive	3	0	1	1.5
Kahn standard	32	3	1	0.8
Kline diagnostic	15	4	4	0.8- 3.1
Kline exclusion	4	2	3	3.1-16.8
Kolmer	18	2	0	0.8- 1.6
Mazzini flocc.	3	1	1	0.8

their cerebrospinal fluids, to which further reference will be made in relation to antibody for spirochetes in normal and syphilitic individuals.

TABLE 6

Falsely Doubtful and Positive Reactions with Cerebrospinal Fluids *

Tests	Total Tested	Doubtful and Positive Reactions	
		No.	Per cent
Eagle Wassermann	106	0	0.0
Eagle macroflocc.	110	0	0.0
Davies-Hinton flocc.	107	0	0.0
Kahn presumptive	107	0	0.0
Kahn standard	217	3	1.3
Kline diagnostic	122	1	0.8
Kolmer	214	0	0.0
Mazzini flocc.	106	0	0.0

* Based on the 1935 serologic survey and the 1941 Washington serology conference

BIOLOGICAL FALSELY DOUBTFUL AND POSITIVE REACTIONS IN DISEASE AND OTHER CONDITIONS

As previously stated, falsely doubtful and positive reactions with the various serum tests for syphilis have been reported from time to time in a very large number of various diseases and conditions. No useful purpose is served by reviewing the very extensive literature on the subject and particularly the early literature. But even in the case of present-day methods it is difficult to draw hard and fast deductions, largely because of the practical certainty that many of the nonspecific reactions reported have been due to technical factors. Furthermore, with the possible exception of leprosy, it is more or less characteristic of the diseases yielding biologic nonspecific reactions that the true incidence of falsely doubtful or positive reactions may not be elicited by single examinations, especially since they tend to be evanescent and disappear within relatively short periods of time following recovery.

But that falsely doubtful and positive reactions may be due to the presence in sera of a reagin-like or other substance in some diseases, and particularly those due to infections, is now well proved. In Table 7, I have divided these into three groups including a large number in which the evidence is not by any means conclusive at the present time. In this connection it would appear, however, that yaws and pinta may be excluded from the category of biological nonspecific reactions, as the phrase is ordinarily interpreted, because both diseases are due to treponemas either so closely related to *Trepanema pallidum*

TABLE 7

Diseases and Conditions Known or Suspected of Causing Biological Falsely Doubtful and Doubtful Reactions

Group A Variable Incidence	*Group B Incidence Unknown*	*Group C Evidence Not Conclusive*
Yaws	Febrile diseases	Rheumatic fever
Pinta	Upper respiratory tract infections	Glanders
Leprosy	Active tuberculosis	Chancroid (buboes)
Malaria	Septicemia	Vincent's infections
Vaccinia and vaccinoid	Subacute bacterial endocarditis	Rocky Mt. spotted fever
Infectious mononucleosis	Ac. lupus erythem.	Lymphopath. venereum
Virus pneumonia	Relapsing fever	Leishmaniasis
	Rat bite fever	Leukemia
	Weil's disease	Pellagra
	Typhus fever	Psoriasis
	Trypanosomiasis	Coronary thrombosis
		Diabetes mellitus
		Eclampsia
		Lead poisoning
		Acute alcoholism
		Ether anesthesia
		Sulfonamide therapy
		Serum therapy

or, indeed, the latter itself as so stoutly maintained by some investigators in so far as yaws is concerned. The literature on pinta has been thoroughly reviewed recently by Stokes, Beerman, and Ingraham.[3]

per cent, of a group of 65 cases of vaccinia showed falsely doubtful or positive serological reactions as well as 10, or 30 per cent, of a group of 45 cases of vaccinoid. In the majority of instances these reactions were observed

TABLE 8

Falsely Doubtful and Positive Reactions Occurring in Presumably Non-syphilitic Individuals with Various Diseases and Conditions *

	Leprosy (4), (5)		*Malaria (4), (5)*		*Vaccinia (7), (8)*		*Tuberculosis (4), (5), (6)*		*Febrile Dis. (4), (5)*	
Tests	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*
Eagle Wass.	59	45.7	12	25.0	...	....	59	0.0	46	0.0
Eagle flocc.	110	68.2	45	22.2	...	....	562	0.7	90	1.1
Hinton	60	28.3	48	16.7	263	11.8	562	2.5	89	4.5
Kahn stand.	107	63.5	47	30.0	202	8.9	561	0.5	92	0.0
Kline (diag.)	110	61.8	47	21.3	263	5.3	110	0.9	90	0.0
Kolmer	109	63.3	47	29.8	465	3.9	560	0.16	91	2.2
Mazzini flocc.	58	38.0	12	50.0	465	12.3	59	0.0	46	0.0

* Single examinations

As shown in Table 8, the incidence of doubtful and positive reactions in leprosy as based upon single examinations by author-serologists in the 1935 and 1941 Washington serology surveys, has varied from 38 to 68.2 per cent while the incidence in malaria has varied from 21.3 to 50 per cent. In malaria, however, Kitchen, Webb, and Kupper [19] have reported that serially repeated tests show that 90 to 100 per cent of patients at some time in the course of the disease give biologic falsely positive Wassermann and Kahn reactions.

Since Barnard [20] first reported biologic falsely positive reactions occurring in an individual with vaccinia, the series of cases reported by Lynch and his colleagues [7] and Favorite [8] have together shown an incidence of doubtful and positive reactions varying from 3.9 to 12.3 per cent (Table 8) with the probability that the incidence is higher in flocculation than in complement-fixation tests. In this connection Major Charles R. Rein, Chief of the Division of Serology of the Army Medical School, informs me [21] that 26, or 60

during the second week following vaccination and, with one exception, disappeared within 3 months. Of 28 additional individuals developing immediate or immunity reactions, only 2 showed doubtful or positive reactions. Incidentally, Major Rein also states that very few, if any, soldiers, showed doubtful or positive reactions ascribable to vaccination against tetanus or typhoid fever.

Curiously enough, however, while it is definitely proved that vaccinia and vaccinoid may produce temporary falsely doubtful or positive reactions in human beings, this may not occur in experimental vaccinia of rabbits. At least Miss Rule and I have observed negative Kahn, Kline, and Kolmer reactions in all of a small group comprising 12 normal rabbits with vaccinia in tests conducted 4 days, 1, 2, 3, and 4 weeks after the development of vaccinal lesions of the abdominal skin. All of the animals were selected on the basis of two preliminary negative Kahn, Kline, and Kolmer reactions before inoculation with highly virulent virus, all of the Kolmer tests being conducted

by the modification of my test [22] for avoiding the nonspecific reactions shown by a large percentage of normal rabbits.

It would also appear that pulmonary tuberculosis, especially active febrile cases (Table 8), may show a very low incidence of falsely doubtful or positive reactions [4, 5, 6] as may likewise be true of other febrile diseases [4, 5] and especially the acute exanthemata. Here again, however, Miss Rule and I have observed no confirmatory evidence in our experiments with a small number of rabbits. For example, 12 normal animals were selected on the basis of two preliminary negative Kahn, Kline, and Kolmer reactions. Four were inoculated intradermally (abdominal) with a virulent broth culture of Type I pneumococcus, 4 with a virulent culture of group A hemolytic streptococcus, and 4 with a virulent culture of *Staphylococcus aureus*. Within 48 hours all developed large lesions and fever, 4 succumbing with septicemia (positive heart blood cultures) in 3 to 7 days after inoculation. Kahn, Kline, and Kolmer tests conducted with the sera of surviving animals 4 days, 1, 2, 3, and 4 weeks after inoculation gave consistently negative reactions in all.

However, special mention should be made of falsely doubtful and positive reactions occurring in atypical pneumonias, and especially those due to viruses. Major Rein states [21] that 10 cases in 50 have shown them after the 12th day of the disease, the majority disappearing or reacting negatively in 2 to 6 months.

In afebrile diseases, obstructive jaundice, malignant tumors, menstruation and pregnancy, however, the incidence of falsely doubtful and positive reactions (Table 9) is apparently so nearly the same as may be expected from technical factors that I believe it may be properly stated that these diseases and conditions do not yield biologic nonspecific reactions.

TABLE 9

Falsely Doubtful and Positive Reactions Occurring in Presumably Non-syphilitic Individuals with Various Diseases and Conditions *

	Afebrile Dis.† (5)		*Jaundice (4)*		*Tumors ‡ (4), (5)*		*Menstruation (4)*		*Pregnancy (4)*	
Tests	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*
Eagle Wass.	131	0.0	..	...	48	0.0	..	...	..	...
Eagle flocc.	131	1.5	49	0	109	0.9	25	0.0	54	0.0
Hinton	131	0.0	51	5.9	110	4.5	24	4.2	53	5.7
Kahn (stand.)	131	0.0	51	1.9	111	0.0	25	0.0	54	0.0
Kline (diag.)	131	0.0	51	0.0	111	0.0	25	0.0	54	0.0
Kolmer	129	0.8	50	2.0	111	0.9	25	0.0	54	0.0
Mazzini flocc.	131	1.5	..	...	49	0.0	..	...	..	...

* Single examinations

† Convalescent pneumonia, diseases of gastrointestinal tract, diabetes, cardiovascular disease, postoperative convalescence and fractures

‡ Malignant neoplastic disease

Unfortunately infectious mononucleosis has not been subjected to study in the serologic surveys. Furthermore, the literature is quite contradictory and confusing and fails to indicate the true incidence of falsely doubtful and positive reactions in this disease because it is based so largely upon single examinations. Thus, as shown in Table 10, the incidence of reactions reported by various investigators has varied all the way from none to 100 per cent, with an average of 7.3 per cent doubtful or positive complement-fixation reactions in 202 cases and 9.6 per cent doubtful or positive flocculation reactions in 157 cases.

TABLE 10

Doubtful and Positive Reactions Reported in Infectious Mononucleosis *

Authors	Complement-fixation		Flocculation	
	No. Cases	No. Doubtful or Positive	No. Cases	No. Doubtful or Positive
Parkes-Weber [9]	..	..	3	1
Parkes-Weber and Bode [10]	3	3	3	2
Gooding [11]	27	16	..	..
Butt and Foord [12]	18	0	..	..
Bernstein [13]	37	6	37	4
Fowler and Tidrick [14]	3	2	3	1
Kauffman [15]	82	3	82	1
Mills and Jahn [16]	9	0	9	0
Werlin, *et al.*[17]	4	4	4	4
Kolmer, *et al.*[18]	19	1	16	2
Totals	202	35 (7.3%)	157	15 (9.6%)

* Mostly single examinations

SEROLOGIC INDICES

While it is not my purpose to discuss at length the present-day serologic tests from the standpoint of sensitivity in the serum diagnosis of syphilis, the subject may be referred to briefly. In Table 11 has been summarized the doubtful and positive reactions reported by author-serologists in the nine serologic surveys, including the Washington serology conference, as indicative of what may be expected under optimum conditions with the tests listed. It will be observed that the incidence for all cases of syphilis, treated and untreated, has varied from 77.6 to 90.9 per cent. But in evaluating the various tests due consideration must be given the incidence of falsely doubtful and positive reactions. I have sought to do this in each test by subtracting from the percentage of reactions observed in syphilis (Table 11) the percentage observed in presumably normal non-syphilitic individuals (Table 2) multiplied by 10, as suggested by Herman Brown. The results are what I have termed the "serologic indices" shown in Table 11. On this basis the present-day serologic tests listed in the table show indices varying from 66.5 to 84.5 per cent. Needless to state, it is not reasonable to expect that any serologic test can be made sufficiently sensitive to yield positive reactions in all cases of syphilis under conditions whereby the incidence of falsely doubtful and positive reactions are kept at their present very low

TABLE 11

Doubtful and Positive Reactions Reported by Author-Serologists with the Sera of Syphilitic Individuals in the Serologic Surveys *

Tests	Total Sera Tested	Doubtful and Positive		Serologic Indices
		No. Sera	Per cent	
Eagle Wassermann	1,678	1,302	77.6	77.6 — (0.6 × 10) = 71.6
Eagle macroflocc.	1,880	1,544	82.1	82.1 — (1.4 × 10) = 68.1
Eagle microflocc.	1,104	944	85.5	85.5 — (1.9 × 10) = 66.5
Hinton regular	2,281	1,941	85.1	85.1 — (0.5 × 10) = 80.1
Kahn presumpt.	1,855	1,559	84.0	84.0 — (0.3 × 10) = 81.0
Kahn stand.	2,083	1,647	79.1	79.1 — (0.2 × 10) = 77.1
Kline diag.	2,295	1,860	81.0	81.0 — (0.4 × 10) = 77.0
Kline exclusive	1,489	1,353	90.9	90.9 — (1.0 × 10) = 80.9
Kolmer	2,276	1,790	78.6	78.6 — (0.0 × 10) = 78.6
Mazzini flocc.	835	722	86.5	86.5 — (0.2 × 10) = 84.5

* 1935–1943 including the Washington serology conference

and gratifying levels. For example, time is required for the production of reagin in primary syphilis, and its production in chronic latent syphilis may be so slight as to escape serological detection. Undoubtedly, however, further serologic research will improve sensitivity, especially in the way of producing superior antigens, but this is only to be welcomed in case the incidence of nonspecific reactions due to *technic* is kept at or very near zero. It may be, however, that any material increase in sensitivity for syphilis will also increase the incidence of biologic nonspecific reactions in normal individuals and those with non-syphilitic diseases.

SPIROCHETAL COMPLEMENT-FIXATION TEST

While the pioneer investigations on complement-fixation in syphilis employing antigens prepared of cultures of alleged *Treponema pallidum* were conducted in this country about thirty years ago by Noguchi,[23] Craig and Nichols[24] and Kolmer, Williams, and Laubaugh,[25] the subject never attracted much attention until 1929 when Gaehtens and Otto[26] greatly renewed interest in it by reporting that a phenolized saline suspension of cultures of the Reiter strain of alleged *T. pallidum* as antigen, commercially available in Germany under the name of "Palligen" yielded specific complement-fixation reactions in syphilis which were apparently separate and independent of the Wassermann and flocculation reactions as well as more sensitive than the latter, especially in treated syphilis. I have elsewhere summarized the literature on the subject,[27] but here it may be stated that of a total of 13,636 tests conducted with "palligen" and the sera of syphilitic individuals, the incidence of positive reactions has varied from 44.5 to 100 per cent, with an incidence of positive Wassermann reactions varying from 30.4 to 100 per cent. In a total of 36,255 tests conducted with "palligen" and the sera of presumably non-syphilitic individuals the incidence of falsely positive reactions has varied from 0 to 3.4 per cent, with an incidence of 0 to 2.7 per cent in the case of the Wassermann reaction.

In the Washington serology conference[5] complement-fixation tests were conducted by Dr. Eagle with a spirochetal antigen prepared of cultures of the Reiter strain. Carola E. Richter of the Pennsylvania State Department of Health Laboratories, who kindly substituted for me at the conference, also conducted the Kolmer complement-fixation test with an antigen prepared of cultures of the same strain by Clara Kast. The results observed with both tests, as well as in duplicate tests employing the Eagle and Kolmer tissue or lipoidal antigens, are summarized in Table 12.

It will be observed that the two spirochetal complement-fixation tests yielded from 0.6 to 2.9 per cent falsely doubtful and positive reactions with the sera of normal individuals. In the Kolmer tests this percentage was not as high as previously reported[28] because the antigen was used in a smaller amount, but Kolmer and his colleagues[27 28] have ascribed them to the presence of natural spirochetal antibody in human sera which is apparently of a group character, as similar reactions have been observed with antigens prepared of cultures of *T. microdentium* and *T. macrodentium*.[28] As expected, no falsely doubtful or positive reactions were observed with either test in the examination of cerebrospinal fluids from 107 presumably normal individuals and non-syphilitic individuals afflicted with neurologic or mental diseases, because natural antibodies do not ordinarily occur in normal spinal fluids. But it is evident, as shown in Table 12, that this spirochetal antibody is increased not only in syphilitic but in non-syphilitic

TABLE 12

Percentages of Doubtful and Positive Reactions in Complement-Fixation Tests Employing Tissue and Spirochetal Antigens *

Clinical Status	Total Sera Tested	Eagle Tests		Kolmer Tests	
		Tissue Antigen	Spiro. Antigen	Tissue Antigen	Spiro. Antigen
Normal individuals	169	0.0	0.6	0.0	2.9
Afebrile diseases or conditions	130	0.0	2.3	0.8	6.2
Intercurrent febrile diseases	46	0.0	4.4	2.2	10.9
Tuberculosis (any type)	59	0.0	3.4	0.0	6.6
Malignant disease	49	0.0	8.1	0.0	20.4
Leprosy in any stage	60	45.7	24.1	61.0	28.8
Malaria (febrile and afebrile)	12	25.0	25.0	54.5	27.3
Early syphilis (prim. and sec.)	45	84.1	88.8	91.1	84.4
Syphilis, less than 4 yrs.	119	49.5	61.3	60.5	59.6
Syphilis, over 4 yrs.	212	68.3	90.0	80.0	80.5

* Based upon the results reported at the Washington serology conference

individuals as well with febrile and afebrile intercurrent diseases, tuberculosis, malignant disease, leprosy, and malaria. Under the circumstances it is also evident that the spirochetal complement-fixation test is of no value in differentiating between true and falsely doubtful and positive reactions in so far as serum tests are concerned. It may be otherwise, however, in the case of tests employing cerebrospinal fluid, not only because falsely doubtful and positive reactions apparently do not occur in normal individuals in tests employing spirochetal antigens, but because both Eagle and Kolmer reported about 85 per cent doubtful and positive reactions in 127 treated and untreated cases of syphilis of the central nervous system. Under the circumstances a positive spirochetal complement-fixation reaction with spinal fluid in a doubtful case of syphilis may be of value in establishing the presence of the disease, although a negative reaction is of no value in excluding the possibility of its presence. In this connection it is also to be stated that Kolmer, Kast, and Lynch [29] found that antigens prepared of virulent *T. pallidum* (Nichols-Hough strain) obtained from acute testicular sypilomas of rabbits, were more sensitive and specific than antigens prepared of cultures of alleged *T. pallidum*, but owing to technical difficulties in their preparation they probably cannot be employed.

Undoubtedly, therefore, antibody for *T. pallidum* is produced in syphilis and presumably likewise in yaws and pinta. This is based not only upon complement-fixation but upon agglutination tests as well in so far as syphilis is concerned.[29] Why an increase of spirochetal complement-fixing antibody occurs in leprosy, malaria, tuberculosis, and other diseases listed in Table 11 is difficult to state. It may be assumed that the plasmodia of malaria and the bacillus of leprosy share with *T. pallidum* a common antigenic substance responsible for its production. But unless or until proved otherwise, I prefer to assume that in these non-syphilitic diseases it is due to increase of the natural group spirochetal antibody in the nature of an anamnestic reaction.

MECHANISM OF FALSELY DOUBTFUL AND POSITIVE REACTIONS

Little of a definite nature is known of the mechanism of complement-fixation and flocculation reactions in syphilis employing alcoholic extracts of beef heart or other mammalian tissues as antigens. This is very unfortunate because precise knowledge is so important in relation to the solution of the problem of falsely doubtful and positive

reactions. I believe it may be stated, however, that the mechanism is fundamentally the same in each procedure. At least it appears that both are due to the presence in serum and spinal fluid of a substance capable of flocculating the alcohol-soluble tissue lipoids in colloidal suspension. In complement-fixation tests these flocculi cannot be seen with the naked eye, but are capable of absorbing or fixing complement. But under proper technical conditions the flocculi can be rendered grossly visible, as in the macroscopic flocculation tests, or, microscopically visible by ordinary examinations, as in the microscopic flocculation tests.

The important question concerns the nature of this flocculating substance. This applies not only to syphilitic human beings but also to normal persons and non-syphilitic individuals with other diseases; also to normal rabbits, cattle, horses, mules, chickens, and other lower animals which are well known to yield biological falsely doubtful and positive complement-fixation and flocculation reactions. It is commonly regarded as an antibody or antibody-like substance known as reagin.

In the light of our present knowledge, however. it seems to me that this substance is not an antibody and quite separate and apart from the spirochetal antibody previously discussed. Rather it appears that it may be a modified serum globulin which may not be detected by ordinary chemical methods, although Cardon and his colleagues [34] have suggested recently that hyperproteinemia, and especially hyperglobulinemia, may be in relation to the mechanism of biologic nonspecific reactions. At least various investigators [31-34] have shown that practically all sera of normal persons contain a substance capable of flocculating tissue lipoids under suitable technical conditions. Under the circumstances it appears that the difference between non-syphilitic and syphilitic sera is one of degree rather than of kind—quantitative rather than qualitative.[31] In syphilis, yaws, and pinta it may be that the reacting substance is only an increase of this factor, although I believe that it may be a globulin or a modified globulin which, as previously stated, may not always be detected by the usual chemical methods now employed. If this is true, one may readily understand that an increase of a normal globulin or its modification may account for positive complement-fixation and flocculation reactions not only in syphilis, yaws, and pinta, but in an occasional normal person as well as in non-syphilitic individuals with leprosy, malaria, vaccinia, infectious mononucleosis, virus pneumonia, etc.

I have elsewhere discussed this subject with more detail [27] but here it may be stated that the preponderance of evidence at the present time is in favor of regarding the reagin as separate and distinct from the spirochetal antibody. Gaehtgens [35] as well as Kroó, Schultze, and Zander [36] have expressed this opinion while Beck,[37] Kolmer, Kast, and Lynch [38] have come to this conclusion largely on the basis of absorption tests with syphilitic sera with tissue lipoids for the removal of the reagin and with spirochetes for the removal of the spirochetal antibody. Eagle and Hogan,[39] however, have stated on the basis of their absorption experiments, that the lipodotropic reagin and spirochetal antibody are identical, or, in other words, that positive complement-fixation and flocculation reactions with tissue antigens as well as positive spirochetal complement-fixation reactions are due to spirochetal antibodies.

Be this as it may, the important practical question is whether or not the reagin responsible for biological nonspecific reactions with the sera of human beings and the lower animals is different in its properties from the reagin

responsible for complement-fixation and flocculation reactions in syphilis, yaws, and pinta. Kahn [40] believes that the former is most active in flocculation tests conducted at a cold temperature (1° C.) and when the salt concentration of the reacting system is reduced to a minimum, while the latter is most active at body temperature. On this basis he has devised various "verification tests" for differentiating between biological nonspecific and specific reactions to which further reference will be made. Here it may be stated, however, that in the Kolmer complement-fixation test, at least, there can be no doubt of the fact that the reagin produces much more complement-fixation at a cold temperature of 4 to 8° C. over a period of 15 to 18 hours than in a water bath at 38° C. for 1 hour, regardless of whether it is occurring in the normal sera of human beings or the lower animals, in the sera of non-syphilitic human beings with various diseases and conditions, or in the sera of syphilitic human beings. In other words, differentiation between biological nonspecific and specific reactions has not been found possible on the basis of the temperature employed in conducting the tests in so far as complement-fixation is concerned.

Personally, however, I am not without hope that a solution of the problem will be found by changing the methods employed in the preparation of tissue antigens. Investigations now being conducted by Herman Brown and the writer indicate that it may be possible to remove certain lipoids with which the nonspecific reagin reacts without reducing the sensitivity of the antigen in relation to the syphilis reagin. Furthermore, if it is found possible to prepare antigens which are satisfactory for the serodiagnosis of syphilis without the addition of a sensitizing sterol, like cholesterol, an additional step toward a solution of the problem will have been accomplished, and I am not without hope that this is possible.

MANAGEMENT OF FALSELY DOUBTFUL AND POSITIVE REACTIONS

While these matters are being ironed out by present and future serological investigations, however, the management of falsely doubtful and positive reactions occurring under present conditions constitutes a practical problem of first rate importance in order to reduce to a minimum the regrettable error of the needless treatment for syphilis. To this end the close coöperation of clinicians and serologists is required. Even though the incidence of non-specific reactions due to technic is very low, when present-day approved tests are correctly conducted, and even though false reactions with the sera of normal, presumably non-syphilitic, individuals may occur only once in anywhere from 1,000 to 4,000 examinations, yet all figures and statistics are of little avail in so far as the individual involved is concerned.

As summarized in Table 13, certain clinical procedures are indicated. It is a mistake for the physician to place the whole burden on the laboratory. Certainly no director of a laboratory, serologist or technician who is completely ignorant of the clinical status of the individual and the conditions surrounding the collection, labelling, and delivery of the specimen, can make so important a decision as to whether syphilis is or is not present, whether treatment should or should not be given or, in the case of the latter, the kind and duration of treatment to be administered. In other words, the serologic tests alone are insufficient and do not constitute a short-cut or royal road in differentiation between true and false doubtful and positive reactions. As a matter of fact, the difficulty in the interpretation and management of presumably nonspecific reactions is in

TABLE 13

Clinical Procedures in the Interpretation and Management of Presumably Falsely Doubtful and Positive Reactions

1. Collect and deliver specimens with due care against bacterial and chemical contamination to avoid technical nonspecific reactions (see Table 1).
2. A negative history for syphilis is of little or no value in excluding the possible presence of the disease.
3. Make thorough examinations for acquired and congenital syphilis.
4. Take careful history and make necessary examinations if and when necessary for the diseases and conditions capable of yielding biological nonspecific reactions (see Table 7).
5. Examine spinal fluid in selected cases. Positive results are indicative of syphilis. Negative results do not exclude its possible presence.
6. Provocative treatment may be tried in some cases but negative serologic results do not exclude the possibility of syphilis.

relation to the clinical skill and experience of the physician in chronic acquired and especially late congenital syphilis. There is no substitute for thorough clinical examinations so skillfully indicated and outlined by Stokes and Ingraham [41] and by Moore and his colleagues.[42]

On the other hand, however, serologists and technicians cannot escape participation and a heavy responsibility in the elucidation of the problem in individual cases as I have attempted to summarize in Table 14. Certainly there is no one best test for syphilis. Serological diagnosis is always best served by using two or more approved methods routinely of which, in my opinion, one at least should be a complement-fixation procedure. Needless to state, this is not always possible when very large numbers of tests are to be conducted, as in state and other laboratories. Under such conditions a screen test of acceptable sensitivity and specificity is required, of which my preference is for one of the microflocculation procedures. But I believe that all positive reactions should be checked by another method before a report is rendered. Under these conditions it is inevitable that a screen test may occasionally give a falsely negative reaction, but unless conditions permit the routine use of two or more methods it is about the best that a hard worked laboratory can do. In my own laboratory all sera are tested routinely by a complement fixation, a macroflocculation and a microflocculation procedure.

As previously stated, physicians should never jump to the conclusion that syphilis is present on the basis of a single doubtful or positive reaction unless there is supporting historical or clinical evidence. But, on the other hand, they should not be ignored simply because clinically unsuspected. When such reactions are suspected of

TABLE 14

Serological Procedures in the Interpretation and Management of Presumably Falsely Doubtful and Positive Reactions

1. Conduct the test or tests with care and skill exactly as described by author-serologists to avoid technical nonspecific reactions as much as possible (see Table 1).
2. Conduct the tests by several methods in the same or different laboratories.
3. Spirochetal complement-fixation reactions with *sera* are of no value but positive reactions with *spinal fluids* are indicative of syphilis; negative reactions do not exclude its possible presence.
4. The value of verification tests is uncertain but they are worthy of trial.
5. Withhold judgment and treatment but repeat the tests at intervals over a period of at least 3 to 6 months. If negative reactions occur syphilis is usually to be excluded; if positive reactions persist syphilis is probably present and treatment is advisable.

being nonspecific, judgment and treatment should be withheld for at least 3 to 6 months, with a repetition of the tests every 2 to 4 weeks. If, during that time, the reactions have become repeatedly negative and there are no historical or clinical evidences of syphilis, it would appear that the disease may be excluded. However, if persistently positive reactions are observed with approved methods properly conducted, even though but weakly positive, I see no escape from the advisability of making a tentative diagnosis of syphilis and instituting treatment in the best interests of the individual involved.

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Discussion

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THE concluding paragraph of Dr. Kolmer's paper conveys a thought which may well deserve further emphasis, especially in regard to the transposition of test findings into terms of clinical syphilis. Almost from the time of the development of the Wassermann test a positive finding has been accorded a diagnostic weight amounting almost to infallibility. As the newer tests were developed and came into use they were permitted to share in this position of reliability. As the use of the tests became more general and as the multiple testing of individual sera was practised, the vagaries and discrepancies of test findings became apparent in treated syphilis as well as in conditions without syphilis as a causative factor.

At the present time, and assuming that the methods which are available are carried out in an acceptable manner, the advisability of exercising a careful scrutiny of all factors involved, before permitting the diagnosis of syphilis to be based entirely upon serologic findings, is accepted. This is important especially when clinical and historical confirmations are lacking. The waiting period, referred to by Dr. Kolmer, during which the diagnosis is withheld although positive test findings may have been recorded, serves as a safeguard in instances in which such conditions as infectious mononucleosis, virus pneumonia, vaccinia, or any of a host of other intercurrent factors may be responsible for the positivity expressed by one or a group of well conducted tests. A time interval of several months before making an arbitrary diagnosis is sometimes sufficient for the reacting substance to disappear entirely from the blood serum or to have been reduced in concentration to a point that the decline in strength of the reaction is obvious.

The use of the waiting period is of limited helpfulness in instances of false positive or discrepant findings occurring in pregnancy. Here it becomes necessary to take into account the risk of an unfavorable outcome as regards the child. This consideration sometimes dictates that the patient be placed under treatment without appreciable delay and without too much regard for the refinements of diagnosis. An attempt to establish the true syphilis status of the mother should be made after delivery although the interposition of treatment always complicates the diagnostic problem.

It is felt that the practice of reporting test results as positive, doubtful, or negative makes impossible the best usefulness of serodiagnostic tests in instances of biologic false positive reactions. A positive report may be given to a reaction which is just sufficient to be so classified or it may represent a concentration of reacting substance manyfold that required to produce the minimal reaction. The authenticity of the minimal reaction may well be questioned in instances in which there is lack of confirmation by history or clinical findings. A persistent positive reaction of high titer is, in the majority of instances, the product of syphilis. The information which would permit the diagnostician to make a discrimination of this kind is lost through the practice of withholding the numerical reading of the degree of positivity.

Hard of Hearing Appointments

The American Society for the Hard of Hearing, Washington, has announced the appointment of Raymond H. Greenman, as Managing Director of the Society. Mr. Greenman succeeds Betty C. Wright, who is on leave to serve with the American Red Cross as consultant in Army hospitals for the care of deafened soldiers. Miss Wright will return to the Society as Director of Field Service. Mr. Greenman leaves a war assignment with the American Social Hygiene Association and was formerly Executive Secretary of the Tuberculosis and Health Association of Rochester and Monroe County, N. Y.

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A NEW SERUM FOR A NEW PURPOSE

OUR older public health workers will recall ancient controversies between adherents of the "humoral theory" of immunity based on the work of Pasteur and the "cellular theory" suggested by the studies of Mechnikov. This apparent conflict has disappeared, with recognition of the fact that substances present in the blood stream must obviously be produced in living cells somewhere in the body; and the work of Besredka and Kahn has emphasized the fact that protective substances are often actually highly concentrated in particular body tissues such as the skin and the peritoneum.

Almost all of our previous researches have, however, been concerned with antibodies produced in response to the stimulus of materials derived from foreign protein or protein-like substances and specifically protective against such alien substances. In other words, they have been concerned with the sort of phenomena which can be classed as manifestations of specific immunity.

Within the past few years, a group of Russian biologists have opened up an entirely new area of research, based on evidence that the injection of material from the human body itself can stimulate the reticular system to a state of higher activity, which manifests itself in enhanced power to combat disease. This is a phenomenon of increased vital resistance against various maladies, rather than a specific immunity against any single foreign protein; and is related to the activity of connective tissue—a tissue which is conceived, not as primarily a mechanical framework of the body, but as a system of primary importance in the regulation of nutrition and metabolism. We may some day say that a man is as old as his connective tissue—rather than as old as his arteries.

The procedure developed by A. A. Bogomolets and his associates at the Institute for Experimental Biology and Pathology of Kiev [1] involves the production of an "Anti-Reticular Cytotoxic Serum" by the injection of horses with the cellular material from human spleen and bone marrow; and interesting methods of titrating the resultant horse serum have been devised by complement-fixation and in other ways. The Russian experiments suggest that this serum: (a) stimulates the production of hemolysins and agglutinins and the process of phagocytosis

(in a general rather than a specific sense) and is of value in puerperal and other infections; (b) aids materially in the treatment of war wounds and other surgical conditions and of frost-bite; (c) produces definite lowering of abnormal blood pressures; (d) in animals, checks the development of malignant growths. In the latter case, and perhaps under other conditions, excessive amounts of the serum produce a definitely unfavorable effect, so that dosage is of primary importance.

All this is, in high degree, startling and revolutionary; but the evidence presented is comprehensive and highly suggestive. This may prove to be one of the most far-reaching of the many interesting discoveries which have come to us from the great institutes of scientific research of the Soviet Union.

REFERENCE
1. *Am. Rev. Soviet Med.*, Vol. I, pp. 101–129 (Dec.), 1943.

FLUORINE AND DENTAL CARIES

IT was nearly thirty years ago that Black and McKay demonstrated the relation of an excess of fluorine in drinking water to mottled enamel; and later researches showed that the presence of over 1.5 p.p.m. of fluorine in a public water supply was definitely associated with the presence of this particular dental condition.

In 1938, Dean, of the U. S. Public Health Service, noted that, among school children, in areas supplied with drinking water of high fluorine content and in which mottled enamel was endemic, incidence of dental caries was noticeably low. The relationship thus suggested was confirmed by chemical studies of the fluorine content of carious and non-carious teeth and by animal experimentation. It seems clear that we have, in this case, an intriguing example of the desirability of maintaining in the human body an optimal concentration of a particular chemical element—a value below this optimum tending to favor one diseased condition and a value above this optimum to cause another disease of a different type. It is possible that data with regard to fluorine content of water and food may explain in part the remarkable freedom from dental caries of certain primitive peoples and the alleged differences in this disease in first and second generation immigrants in this country.

In view of the extensive incidence of dental caries and of the baffling obscurity which has shrouded its causation, these discoveries are of primary importance; and the symposium presented on this subject was one of the highlights of the last A.P.H.A. meeting.[1]

The possibility of controlling the development of dental caries by increasing the fluorine-content of public water supplies deficient in this element is obviously suggested; and Faust and other engineers have pointed out the practicability and economy of such a procedure. It would appear from the extensive studies of the U. S. Public Health Service that a 50 per cent reduction in the incidence of dental caries could be anticipated.

The addition of fluorine to water supplies would, however, chiefly affect the population of the future, since the process is fully effective only on individuals supplied with fluorine during the first eight years of life; and it could obviously influence only those persons served by public water supplies. Bibby and Cheyne in 1942 suggested the direct topical application of fluorides to the permanent

teeth of older children. Recent studies have been made by Knutson and Armstrong of the U. S. Public Health Service group, in which the teeth in one quadrant were treated and future development of caries noted and compared with an untreated quadrant as a control. These studies have indicated an approximate 40 per cent reduction in newly developed dental caries as a result of this procedure. The treatment is not effective in checking extension of caries on an individual tooth already attacked. Bibby [2] has recently been a strong advocate of the topical application of fluoride for prevention of caries.

If both the treatment of water supplies and the topical application of fluorine to the teeth were employed, there would be ample need for all the conventional facilities in the form of dental service which we can hope to provide. Gruebbel points out that in one Missouri county the adequate treatment of carious teeth in children between 6 and 14 years of age would require four-fifths of the time of all the dentists in the county. The studies of the Committee on the Costs of Medical Care showed that in 1929—at the peak of peacetime prosperity—the individual in the lower half of the population from an economic standpoint had on the average one-tenth of a visit to a dentist per year.

If the new knowledge in regard to dental caries can be practically applied it will make a contribution to the health of the people of the first magnitude. In all new developments of science there arise unsuspected obstacles, and we should always be on guard against any attempt to exploit them prematurely. The evidence seems, however, sufficiently clear to warrant carefully controlled experiments on "fluorinization" of water in communities where the fluorine content of water is low (which must obviously be continued over a period of years [3]); and the accumulation by dentists of more extensive evidence as to the effectiveness of topical treatment.

REFERENCES
1. *A.J.P.H.*, 34:133–147 and 239–249 (Feb. and Mar.), 1944.
2. *J. Am. Dent. A.*, 34:228–236 (Feb.), 1944.
3. As suggested by Bernard, *Pub. Health Rep.*, 58:857 (June 4), 1943.

MEDICAL CARE FOR THE WIVES AND INFANTS OF SERVICEMEN

A YEAR of experience has now been accumulated with the Emergency Maternity and Infant Care program to provide medical, nursing, and hospital care for the wives and infants of enlisted men in the four lowest pay grades of the Army, Navy, Marine Corps, and Coast Guard, which became effective March 18, 1943.

The service is provided under plans administered in each state by the state department of health. It is available as a right to all families of servicemen in the specified grades with no humiliating means test; although it is naturally assumed that the ordinary community facilities, in the form of infant welfare stations and public health nursing service, will not be duplicated, and that infants of servicemen will be accepted by such agencies without financial investigation.

There were naturally misunderstandings and conflicts of interest in the inception of this program; and, in certain states, these conflicts aroused resentment which for a time weakened the confidence of the public in its public health leaders and in the medical profession. Fortunately, these difficulties have been overcome. The program is now in operation in all 48 states, Hawaii, Alaska,

Puerto Rico, and the District of Columbia. By the end of the first year of operation, it is estimated that maternity and infancy care will have been made available to a quarter of a million wives and infants of enlisted men.

The large number of cases cared for testifies to the generous coöperation of the medical profession in this essential contribution to national morale; and the fact that applications are being currently received at the rate of more than 30,000 per month evidences the satisfaction of patients with the service provided.

Our state health departments have met a serious challenge in providing the record-keeping and accounting involved in the application of so large a program. They have learned the job now and complaints from physicians and hospitals of delayed payment are less frequent than at first. The fact that 86 per cent of all maternity cases completed in December, 1943, were delivered in hospitals is highly encouraging; and letters from certain states indicate that applications for care are coming in earlier and earlier in the period of pregnancy.

Opposition to the program has centered almost wholly on the method of payment of physicians and on certain details with regard to the rate of per diem payment to hospitals (the latter difficulties being ironed out as the system evolves).

It has been proposed, for example, that instead of recompensing the physician or the hospital for the service rendered, the patient should receive a financial allotment of some sort and pay her own bills. Such a procedure would, however, be in contravention of the clear intent of the Congress which was to provide medical care and not a cash bonus, and it would obviously preclude the maintenance of any standards of quality of service. Medical economics has its well established principles as clinical medicine has; and one of these principles is that a cash indemnity plan inevitably fails. Artemas Ward once said, "There is a great deal of human nature in man." Enough patients will use their cash for other purposes than that for which it was intended—and enough doctors will add to their charge the amount of any available cash grant—to wreck any program founded on a cast indemnity basis.

A second suggestion is that the patient, if she desires, should be permitted to pay an additional fee to the physician or hospital beyond the rate of payment under state plan. If the doors were once opened to such a procedure, each wife of a serviceman would eventually be forced into a discussion with the hospital and physician as to the amount the traffic would bear and the basic purpose of providing for essential needs without a means test would be defeated.

A third criticism concerns the primary basis of payment to the physician. Consultant services and medical care for unusual conditions not directly related to maternity are provided on a fee-for-service basis, but the routine prenatal, obstetrical, and post-partum care is paid for an a flat rate per case. This system may work hardships on an individual physician who has a few exceptionally difficult cases, but will in general balance out and is eminently desirable from the standpoint of avoiding paper work for physicians and heavy administrative costs. Recent modifications of the plan provide additional fees for certain complicating conditions.

Finally, the actual size of the flat fee has been the subject of extended discussion. The care to be provided is not a "charity" service; nor is it, on the other hand, a luxury service. It cannot be expected that average fees will be paid on a level with the charges of city obstetricians. Discontent naturally arises from the fact that a physician who may, in his ordinary practice, be com-

pletely generous and unselfish in his service to the needy, naturally thinks of the fee he charges to the wealthy as the "normal" price for such service. If the government pays less than this "normal," he feels aggrieved. Yet such a physician actually obtains a far higher total income with fully-paid-up patients at $50 a head than with a few large fees and much free service—at least, when dealing with such families as those here concerned whose heads are now receiving from $50 to $78 a month.

In spite of doubts and difficulties, the program has gone forward with notable success. In March, the Surgeons General of the Army and Navy addressed a special message of thanks to the physicians of the United States for their participation in this enterprise. "Physicians," they say, "the country over are contributing their medical skill in this wartime program generously and in return for moderate recompense. Hospitals the country over have opened their doors to these wives and their infants making available accommodations where their medical needs can be met adequately, though without luxury care. Nurses the country over are helping in the city and the rural homes and in the hospitals. . . . The morale in the armed forces is being raised and our fighting men go overseas with greater confidence in the security of their families because of this wartime program. We who are responsible for the health and medical care of the men in the armed forces are grateful to you—physicians, nurses, and hospitals—who are participating in this program of care for the wives and infants of these men. . . . Your contribution is an invaluable aid to us in the prosecution of the war."

The tribute is well deserved. Similar appreciation should also be extended to the state departments of health and certain city departments which have carried a heavy share in the burden of administering the program; and to Dr. Martha M. Eliot and her staff in the Children's Bureau who have wisely and courageously guided the course of one of the outstandingly valuable wartime efforts in the United States.

Credit Lines

COMPULSORY TREATMENT FOR TUBERCULOSIS

Dr. William P. Shepard, Welfare Division of the Metropolitan Life Insurance Company, San Francisco, has called to the attention of the Managing Editor "an amazing and educational document which deserves wider dissemination." Dr. Shepard has secured the permission of the author, Honorable Marion G. Woodward, Judge of the Superior Court No. 3 of San Joaquin County, Calif., to publish the letter.

"My purpose in calling it to your attention," writes Dr. Shepard, "is that so many health officers, some of them lacking in experience, are so inclined to resort to compulsion when persuasion and education are the indicated procedure. Persuasion and education take so much more time and effort and are not always 100 per cent successful. Nevertheless, many health officers of my acquaintance at least do not appreciate the viewpoint expressed by Judge Woodward."

December 24th, 1940.

Dear Sir:

Your letter of the 17th, informing me of the death of Miss ———— ————, a minor whom I refused to adjudge a ward of the Juvenile Court in order that she might be compelled to accept hospitalization, and taking me to task for failure to "coöperate," has been received.

It would serve no useful purpose to suggest the impropriety of your letter. The point of view behind it, however, interests me. Were it not for the fact that individual rights are being ruthlessly subordinated to the state the world over, I should be quite startled by the subtle implications of your language. But regardless of my personal reactions, the letter indicates that you have not considered the broader aspects of the problem.

First of all, I must point out that the Superior Court is not a benevolent or educational agency which may be expected to "coöperate" with community philanthropy or other worthy effort. Nor is it a Gestapo for dealing with those under-privileged members of society who have not caught up with our advanced standards and who often irritate us by their stupidity and lack of appreciation. On the other hand, the Court is a tribunal whose main function is to determine facts and declare the law applicable thereto. It is not at all concerned with the consequences of its official acts, nor has it any coöperative or other connection with the undeclared policy-making power of the State. This does not mean that judges themselves are always in personal accord with their judgments and decrees, or are unmindful of the fact that perhaps better social results could be obtained had a particular decision been different.

In the ———— case the young woman was not referred to "my court" for aid as that word is ordinarily understood. She had been living at home with her widowed mother and had violated no law. She was, therefore, neither a delinquent nor a dependent. Her home, it may be admitted, was humble and probably contained little more than the bare necessities of life; but she was happy and contented there and desired to remain, and her mother and brother wished her to do so. This being true, the petition for making her a ward of the Juvenile Court was somewhat of a subterfuge, although the broad language of the statute could have been made to fit the situation had I wished to avail myself of it.

The "aid" sought from me, in my official capacity, was a coercive order requiring the mother, against her will and without her consent, to place the girl in the ———— Sanatorium. In other words, the health authorities finding no necessity for quarantine measures, which, in many cases, may be resorted to when the public health is endangered, and discovering no law requiring the compulsory isolation of tuberculosis victims, thought it would be quite appropriate if the Juvenile Court would intervene and, under its wide discretionary powers, apply the necessary force. I declined to do so and have no apologies to make for the decision. Parenthetically, it may be observed that procedures of this kind are almost invariably

directed against illiterate and poverty-stricken individuals who must dumbly accept all official up-lift invasions of their private rights because they have neither the means nor, in many instances, the intelligence to resist.

The problem then has several aspects. You approach it from the humanitarian side, which is always a worthy approach and one that cannot lightly be brushed aside.

As an expert in a highly specialized field, you know that tuberculosis, one of mankind's greatest enemies, can best be treated in a well equipped and properly located sanitarium. Quite naturally you have little patience with a sufferer who fails to perceive so obvious a fact; and, from your letter, I gather that you likewise have little patience with a judge who apparently disregards scientific truth and, with a great show of obsequiousness to the rabble, sends a tuberculosis victim home instead of placing her in a hospital.

I do not wish to be too critical of this viewpoint, but I insist that there are other factors to be considered, especially if one is charged with any sort of governmental responsibility. I am well aware of those borderline cases where parental ignorance comes into conflict with recognized medical standards and where the hazard is more individual than public. And I am always sorely tempted to do *what I personally know will be best for the individual* even though there is some violation of personal rights. In some of these situations it seems fatuous to talk about personal rights. On the other hand, the most of us think and act, as the late Justice Cardozo once pointed out to the law students of Yale University, as our class thinks and acts; and, once we have arrived at an opinion with respect to what is good for others, we rather like the idea of giving it the force of the law. In the Juvenile Court this thought is constantly uppermost in my mind. The hearings are held behind closed doors and the persons involved are not only helpless but seldom represented by counsel. How easily then the Juvenile Court could degenerate into a star chamber proceeding with the judge imposing his own particular brand of culture and morals on indigent people—all under the guise of an extraordinary emergency!

Under our form of government, the family is the unit of society and the relation of parent and child should not be judicially disturbed unless the family situation is intolerable according to minimum standards. Ordinary poverty is generally the excuse but it is not always a justification for interference. And the same may be said for illiteracy. In other words, a poverty-stricken illiterate does not necessarily by that fact alone, forfeit the natural right of being the head of his family and making decisions for his minor children. These decisions are not always wise, and I have already said, there are many occasions when I am sorely tempted to override them and make the decision myself. The law is broad and these invasions of personal liberty can always find justification in the fact that a benefit is to be conferred on the recipient.

It should never be a question of what a judge has the *power to do* under broad statutes and conflicting legal precedents, but what he *ought to do,* keeping in mind always the entire picture of personal rights and their historic background. In recent years we have seen whole populations abroad yield to the seduction of paternalism, with its promises of prosperity and a better life, only to be ruthlessly exploited and persecuted. We do not want the lust for power which is now dominating the minds of so many little men, to wreck our heritage of freedom and individual initiative. To this end judges cannot approach any problem, even that of providing medical care for the indigent, without being alert to fundamental rights. Because a thing is good for an indigent does not always justify the application of force. If we could speak with absolute finality as to what is good and what is bad perhaps the end would often justify the means. But we cannot do this.

When a child needs medical or surgical care and is without parent or guardian, as often happens, I am only too glad to furnish the necessary consent. But when a parent, because of ignorance, opposes a particular method of treatment for his child, I do not always feel that I am justified in using compulsion, although I find myself out of sympathy with his viewpoint. Such was the case with the ———— family. One child had previously died after hospitalization and the illiterate mother believed that ———— would also die if sent away from her home. You may rest assured that I did not overlook the possibilities of this situation. Because our Juvenile Court sessions are quite informal, I spent the greater part of an afternoon trying to persuade the mother and the girl to accept the medical advice which had been given them. I pointed out the advantages which your splendid sanitarium offered and also the probability of death if the girl remained at home, but I could not penetrate the stupidity and superstition of these people and the session ended with considerable unpleasantness. I did, however,

respect their rights and I would do the same again.

Of course, as you must know, I am under no obligation to justify or defend any decision I may be called upon to make. I thought, however, you would appreciate this viewpoint which I have developed at too great a length.

Wishing you continued success in your work, I am,

Very truly yours,

AN OUTSTANDING EXAMPLE OF JOINT PLANNING

It is common to hear commendation of the benefits of joint planning by several agencies, but it is rare to find an example representing so complete a coverage as the following.

Nassau County, N. Y., a populous suburban area near New York City, located on Long Island, has a full-time county health department of which Earle G. Brown, M.D., is Commissioner. There is a County Tuberculosis Sanatorium of which James Walsh, M.D., is Superintendent. There is a County Tuberculosis and Public Health Association, of which Mrs. George E. Brower is President and of which Miss Frances H. Barbour is Executive Secretary.

The Tuberculosis and Public Health Association faced the year 1944 like many other similar voluntary groups with an unbudgeted surplus from the Christmas Seal Sale available for its program. At their initiative and with the coöperation of the State Committee on Tuberculosis and Public Health, George J. Nelbach, Executive Secretary, the State Commissioner of Health, Edward S. Godfrey, Jr., called an informal meeting to consider constructive suggestions for the expenditure by the Tuberculosis and Public Health Association of an unbudgeted balance of approximately $22,000. Represented at the conference was the State Department of Health through the Commissioner, with the General Superintendent of State Tuberculosis Hospitals, the Director of the Division of Syphilis Control and the District State Health Officer from his staff. Two members of the Nassau County Board of Health and the Commissioner of Health were in attendance, and the Medical Superintendent of the County Sanatorium. The President and the Executive Secretary of the Tuberculosis and Public Health Association, the Executive Secretary of the State Committee on Tuberculosis and Public Health and his assistant, and the Field Adviser to the Nassau County Association were present.

The conference explored fruitful expenditures for mental hygiene, for the expansion of tuberculosis case finding and services among family contacts, for the transportation of tuberculosis patients and family contacts to clinics, for the x-raying of general hospital admissions, and other parts of the tuberculosis program, such as rehabilitation. Other subjects were given consideration, such as the need for an expansion of adult health education services in tuberculosis and venereal disease control.

The entire meeting was reported in minutes which, as a pattern, may prove interesting to other agencies wanting to make group planning a reality. Copies may be obtained from Robert W. Osborn, Assistant Executive Secretary, 105 E. 22nd St., New York, N. Y.

CENTRALIZATION AND DECENTRALIZATION

In an article entitled "Shaping the Future of City Planning" (*Better Times*, December 31, 1943, published by the Welfare Council of New York City), Dr. Neva R. Deardorff, Assistant Director of the Welfare Council, discusses the individualistic districting of the city's services—fire and police protection, health, welfare, public schools. In New York none of these services use the same districts, or boundaries; only the Health Depart-

ment follows census tract boundaries. The result is that pertinent social data cannot be organized for the various school districts, welfare, or police districts. The effect of highly centralized city services, therefore, is a total decentralization for any community served and an utter confusion for the ordinary citizen as to where his government functions. Her article is illustrated with a map of one area showing the crisscrossing lines of the five city departments in comparison with which she says "a crazy quilt would appear orderly in design."

Dr. Deardorff's remedy is a fairly simple one: the districting of the city into a number of population groups with a civic center from which would radiate the city's services, each of which might have a different number of subdistricts but none would overlap the larger boundaries and none would violate census tracts. The actual building that housed the central offices of these services in each area would inevitably develop into a civic center and a symbol of government as it affects the day-to-day life of the citizen.

It occurs to us that this thinking has much in common with the planning of the Association's Subcommittee on Local Health Units. On the one hand, New York needs to rescue itself from the chaos of vertical centralization without horizontal coördination. On the other hand, the less populous areas of the country need for public health purposes, and undoubtedly for a great many other public services, a centralization of the numerous and overlapping responsibilities of small and uncoördinated units of government into a centralized unit large enough both to justify and support an adequate public health organization.

The horizontal coördination of various public services, the need for which is illustrated in the New York City situation, is not being lost sight of in the planning of the committee in that, with a few notable exceptions dictated by peculiar local conditions, county boundaries are not being violated in setting up local health units, although several counties may be joined together to form one health unit. Further, close collaboration with the U. S. Public Health Service Division of Hospital Planning assures that the planning of health and hospital jurisdictions does not overlook the need for horizontal coördination.

A NEWS LETTER YOU'LL READ TO THE END

The Venereal Disease Control Division of the Oklahoma State Health Department, Dr. G. F. Mathews, Commissioner, is responsible for an unpretentious, 2 page, mimeographed *News Letter* so beguilingly written that you are irresistibly lured to the end once you start it. Don't be misled by the adverbs. There is nothing whimsical or sentimental about it. It is full of wallop, unwelcome truth, and debunking of smug attitudes. We quote almost the entire first page of the February issue.

> That loud noise you just heard amounts to practically nothing. It was only the soldier-sailor contact reports ringing the bell for a new high in Oklahoma. Central Registry figures show that 372 service men were reported in January to have been infected with a venereal disease in this state. This compares with a former high of 358 in August and represents an increase of 30.9 per cent over the month of December when 284 infections were reported. Maybe it's just one of those things, a bad month when all the little spirochetes and gonococci got together and decided to put on a real show. And then again maybe this is the real thing. Maybe the textbook theory that venereal disease rates must inevitably increase in wartime is about to overtake the inch-by-inch progress for which we have so stubbornly fought during the past two years.
>
> Whatever the reason for this unexpected and totally unwelcome increase in service men infections, let's not be fooled by the comparatively good showing we have made in the Eighth Service Command for the same period. We have used that report too long as a criterion for what we have done and

what we must do. From now on, figures released through this publication will be Central Registry over-all tabulations. The Eighth Service Command figures make up only a part of the picture. For example, in January Oklahoma City had 39 contacts reported from the Eighth Service Command, but when all soldiers and sailors who were infected in Oklahoma City were totalled, it amounted to 89 infections. Tulsa had 18 infections reported in the Eighth Service Command report, but from all service commands, both Army and Navy, 48 infections originated there. And so on. . . .

We heard during the past month of an early syphilis patient who finally named 17 contacts but who gave only one on the original interview because the interviewer was satisfied with just one; of a contact who was able to get the name and even the clinic and patient number of the informant (that's nearly as confidential as a newspaper headline); of a wife who got a letter saying that her husband had gonorrhea and she would have to come into the clinic for an examination; of an acute gonorrhea contact who was not brought into the clinic for an examination because she was on her honeymoon in an apartment three blocks away.

RESPONSIBLE TO WHOM?

Health officials who may sometimes ponder the question of their responsibility will be given food for thought by the following occurrence. In a midwest state an outbreak of typhoid fever assumed sizable proportions with 6 deaths being reported. State health department officials promptly began an investigation and convicted "a product" (unnamed) which thereupon was "taken off the market," it was announced.

Understanding citizens in the affected region may have wondered what the "product" was and later whether they had any of it in their own cupboards—when a paper "leaked" the information that the product was cheese. One newspaper editorialized upon the action of the state health department in withholding the information in this vein:

> Granting that the firm was not at fault and may suffer some financial loss as a result of the publicity given it, the fact still remains that the public is entitled to know just how and where the epidemic started. In the first place some of the company's suspected products might still be on hand in some kitchens, and in the second place all manufacturers of cheese and butter would naturally come under unjust suspicion if the name of the offender had been kept secret. A policy of laying all the cards on the table is usually best anyway in all such matters of public interest or welfare.

We are indebted to the *Health Officers News Digest*, published by the Public Health Committee of the Cup and Container Institute, for the above, which as a proffered contribution to the former, seemed to its editors and to us, a thought-provoking question to pass on to readers of Credit Lines. It reached Credit Lines while a recent report from a Food and Drug Division of a State Health Department was under review. The reviewer was particularly receptive because he was already infuriated by the careful anonymity shrouding "products" which had admittedly been found on examination to be unfit for human consumption, or dangerous to the public health. We echo the question, responsible to whom? Responsible to the manufacturers of "Product A," or the wholesale outlet for "Sample 102," so that the worthless stuff may continue to be profitable, or responsible to the people whose health they are employed to protect?

DADE COUNTY TURNS OUT ITS FOOD HANDLERS

One of the most successful schools for food handlers yet conducted by U. S. Public Health Service's Major L. H. Male and Dr. T. H. Butterworth was sponsored March 14–21 by the Dade County Health Department, Miami, Fla.

The course, covering primary phases of sanitation, bacteria, personal hygiene, food poisoning, storage, and refrigeration consisted of three lessons, each repeated four times. The subjects were

dramatized and supplemented by demonstration, slides, and moving pictures.

Total attendance was 4,738 and included home economic classes, the KP contingent from the local Naval base, and personnel from virtually every type of eating establishment in the county. There was seldom "standing room" in the Central School auditorium where the course was held, and Major Male declared he "hadn't seen anything like it," when asked to compare the attendance with similar schools he has conducted.

Russell Broughman, Bureau of Sanitation director for the County Health Unit, had more than 3,000 food handlers registered through his sanitary inspectors before the school opened—the remaining were registered at the school.

Careful check was kept of attendance, and each person who attended the required three classes received a certificate. Establishments that enrolled 75 per cent of their personnel also received certificates. Some eating houses compelled their entire employee group to attend the course and some even closed at specific hours to allow the personnel to take advantage of the free classes of instruction.

At the suggestion of the Florida State Board of Health, sanitation officers from other county health units attended the course, with the aim of holding similar schools periodically in their counties. Coöperating with the Dade County Health Department and U. S. Public Health Service was Robert G. Carter, technical sanitarian of the Florida State Board of Health.

DR. ROBERT HUGHES PARRY AT HOME

More than 3,000 public health workers in western states and several hundred persons in New York City and elsewhere in the East had the opportunity to meet Dr. Robert Hughes Parry, Health Officer of Bristol, England, when he visited the United States last spring. They will be interested in an account of a recent week-end which Dr. Albert S. McCown, formerly Medical Director of the American Red Cross, and now an officer of the U. S. Army stationed in England, spent with him at his home in Bristol.

Excerpts from Dr. McCown's letter follow:

I went down to Bristol on the Saturday morning train, arriving in time for lunch, stayed over Sunday, made some official visits Monday morning, and returned Monday afternoon.

I cannot tell you what a satisfaction it was to see Dr. Parry in his home environment. His wife is a charming person, a Captain in the British Medical Corps, doing a splendid job in the transfusion service. I shall not attempt to describe their home; their gardens; their friends; nor the place they occupy in the life of Bristol. You will have to come and see it for yourself, and I do hope that some day you will have that privilege.

The purpose of this letter is to confirm for you and the other members of the troupe the accuracy of Dr. Parry's descriptions of Bristol, as immortalized in the famous opus we heard on so many occasions.

First of all, of course, I saw the famous River Avon, down which some famous journeys were made. John Cabot, among others, sailing out to discover a new world, not forgetting that one of the promoters of that voyage was the Sheriff of Bristol, a Mr. Americke. Dr. Parry insists that "whatever the Italians say, we in Bristol *know* that that was the origin of the word America."

Bristol is a City of Churches, mostly burnt out now, built with money made out of the slave trade, a sort of Beveridge scheme for the next world. Now, in the year of our Lord 1944, we find that Bristol's gift of slaves is being returned to Bristol with interest.

I saw, too, St. Mary of Redcliff, which Queen Elizabeth said was the most beautiful Parish Church in England, and so it must be, because no one has ever dared to disagree with Queen Elizabeth!

Sunday afternoon we drove up the road to Cheddar, through the rocky Combe of Barrington, where the Vicar of Blagdon, the Rev. A. M. Toplady, caught in a storm of thunder, lightning, and torrential rain, found refuge in a cleft in the rocks, and, as a result of that experience, wrote the hymn, "Rock of Ages, Cleft for me, Let me hide myself in thee."

On the way back we passed the quay-side of the Port of Bristol, immortalized by Robinson Crusoe and John Silver, and on past the site where St. Peter's hospital used to be, and where worked William Budd, the father of epidemiology. I saw no statue to Jenner. Undoubtedly this would not have been permitted by the anti-vaccinationists, since Bristol is their headquarters. I saw the little brick "cottages"—with their amenities. (Just between you and me they are really two story brick houses but the Bristolians insist on calling them cottages, and cottages they must remain.)

From without, I worshipped at the Chapel of John Wesley, the Founder of Wesleyism and saw the Castle stormed by Sir Thomas Fairfax during the Cromwellian period. It was the same Fairfax family who figured so largely in early American history, it being a Lord Fairfax who owned tremendous estates in Virginia who was surveyed by a youthful George Washington.

In Dr. Parry's own home I saw a Morrison style shelter, just as he had described it. Fortunately there was no necessity to use it during my visit.

So completely delightful was the trip, and so wholehearted the welcome, that Hugh Smith and I plan to go down for another week-end in the near future.

RHEUMATIC FEVER

"Fortunately," says the Children's Bureau, "there is increasing interest in many states and communities in the problems related to the rheumatic child." New releases by the Bureau on the subject include a 4 page pamphlet entitled "Some Facts about Rheumatic Fever" packed full of information. It is to be regretted that a subject of such great importance has to be presented in a format and make-up that reflect some of the limitations under which federal agencies operate in the printing field.

Also being currently distributed by the Bureau is a table showing the state services for children with rheumatic fever that were financed in whole or in part by official state agencies under the Social Security Act, Title V, Part 2, for the year ending December 31, 1942.

The Wisconsin Anti-Tuberculosis Association Social Workers' *Bulletin* dated March 20, 1944, begins what is apparently a series of articles on the subject of rheumatic fever and heart disease. It calls attention to the fact that more than 7,000 children in Wisconsin have rheumatic heart disease, that rheumatic fever produces nearly 50 times as many cripples and semi-invalids as infantile paralysis, and that the disease is responsible for more deaths of children under 15 than tuberculosis. It then goes on to discuss cause, onset, course, complications, and treatment. Its purpose is evidently to inform a non-technical audience, and is well served. Miss Metta Bean, Director of Social Service, signs it. We shall watch for the next issue.

"WHAT YOU NEED TO KEEP STRONG AND WELL"

The Maternal and Child Health Division of the Georgia Department of Health has prepared an informative chart which teaches elementary nutrition lessons in brief text and pictures. Three concentric circles around a sketch of two children show in the first circle "what you need"—vitamin D, vitamin C, etc. The second and third circles synchronize "what it does" and "where you find it," respectively, with vitamin D, vitamin C, etc. The chart is reproduced in black and white with a red border, probably the colors of the original, in *Georgia's Health* for February, published by the Georgia Department of Public Health, Thomas F. Abercrombie, M.D., Director.

CHILDREN: $7,763 EACH

Health workers who are seeking data to emphasize the money value of human life will be interested in the computations recently published by the Metropolitan Life Insurance Company through the *Statistical Bulletin*, Volume 25, No. 1, January, 1944. Tables are presented showing average expenditures

for bringing up a child to the age of 18 by type of expenditure and by various family income levels. Similar figures are presented year by year showing how the accumulations are arrived at.

According to these figures, it costs $7,763 to bring up the average child in a family with $2,500 income and, for a family with $5,000 to $10,000 annual income, the average figure rises to $16,337.

MORE ON ANNUAL REPORTS

It is difficult to do justice to an annual report of a health department, a voluntary agency, a hospital, or any other organization in anything but a full-length review. Too much time and effort go into their preparation to brush them off lightly, even if, as the lad with the harmonica said, "I blow it in so sweet and it comes out so sour."

Because full-length reviews are out of the question, we had decided not to talk about any. In spite of this commendable determination, a handful of especially striking ones, from a variety of sources, for one reason or another, persistently haunts us, and to lay their ghosts, we give them brief mention. They were all blown in sweet and came out that way.

Dr. Edward G. McGavran, Commissioner of Health, St. Louis County Health Department, Clayton, Mo., issues his annual report for 1941 and 1942 under the title "St. Louis County Health in Defense and War." The front cover reproduces a photograph of the attractive new building. There is good balance between readable text and sketches, maps, and graphs. The budget included is unencumbered and understandable.

The Fifth Annual Report of the Housing Authority of the City of New Haven, Conn., which is called "Then and Now" and is Chapter Three of a series, is an appealing document, with excellent photographs facing nearly every page of text and a double spread in the center. Seeing it reminds us that it is important not only to build good houses but to interpret the project to the public. This is good interpretation.

Dr. Charles F. Wilinsky, Executive Director of Beth Israel Hospital, Boston, Mass., makes his report for 1943 a living document even for those who have no particular reason for being concerned with its contents. There is a nice balance between the more systematic narrative and the tables, photographs, and other information.

Interesting approaches to a method of bringing to a community an understanding of its health problems have been used by the State of Nebraska's Department of Health, C. A. Selby, M.D., Director, and by the Spartanburg, S. C., County Health Department, John B. Gelzler, M.D., Director. The first is an almanac, true in size, mustard-yellow cover, news-print paper, and arrangement—true in everything but content—to the old-fashioned kind that used to be put out by Glover's Mange Cure or something similar. The second is a calendar with photographs and a minimum of text.

In "Fifty-Two Weeks with the Louisville and Jefferson County Health Department," Dr. Hugh R. Leavell, Director, takes you through the year and through his department, provocatively and illuminatingly. He rings the bell with his various devices all the way from the title page on through the simple but revealing diagrams of the first page, through the excellent letter of transmittal and into the body of the report.

Small in size, only 5¼ x 3½ inches as it goes through the mails, but telling a big story in its 8 pages, the 26th annual report of the Maternity Center Association, 654 Madison Avenue, New

York, N. Y., is arresting with its title "A Letter from the South Pacific." The introductory copy is moving and the five paragraphs of "some of the things the Association has been doing" are masterpieces of condensation.

"Health Progress through Team Work and Citizen Participation" is the 26th Annual Report of the Public Health Federation and its Councils, Cincinnati, Ohio, Bleecker Marquette, Executive Secretary. Well printed and illustrated, it is a remarkable record of exactly what its title describes.

In tabloid newspaper form, the Warren County Health Department, Bowling Green, Ky., Paul Q. Peterson, M.D., Director, distributes its annual report. It does not have to depend on health department envelopes for mailing. It goes as a special section of the *Park City Daily News*.

"Health in Hartford" for the years 1941 and 1942 is an ambitious 90 page book to which each Bureau has contributed a chapter. It is a factual, detailed account of the activities of a wide-awake, effective health department. Three merged photographs on the cover cleverly assemble laboratory beakers, motion picture reel, the National Health Honor Roll plaque, and other objects relating to each aspect of the department's work. The Health Officer of Hartford, Conn., is Alfred L. Burgdorf, M.D.

Photographs, sketches, maps, and graphs enliven the 54 pages of the "Report on Health and Safety Project of the Girl Scouts, 1939–1942." A comprehensive job has been done here both in the project and in the report. The story is worth telling and is well told.

WORTH QUOTING

Sir William Beveridge suggests as peacetime objectives "making men as free as is humanly possible of the five giant evils—of want, of disease, of ignorance, of squalor, and of idleness, the idleness enforced by mass unemployment. I believe that if we attack those first four giants with all our might, if we spend ourselves generously and our money wisely against want, disease, ignorance, and squalor, we shall find that in the process we have killed also the fifth giant of mass unemployment."

Henry Wallace says—"Second to good and plentiful food I would put good and plentiful hospitals. With more hospitals adequately equipped and staffed, combined with a common sense public health program, we can stamp out tuberculosis, syphilis, and possibly malaria. . . . We ought to be spending 4 times as much on hospitals and doctors and nurses as we are now spending. . . ."—Reprinted from *Washington News Letter on Social Legislation*, February 23, 1944.

BOOKS AND REPORTS

Soviet **Health Care in Peace and War**—*By Rose Maurer. New York: American Russian Institute for Cultural Relations with the Soviet Union, Inc. (56 West 45th Street)*, 1943. 48 pp. Price, $.10.

Soviet Health Care in Peace and War is a pamphlet 48 pages in length, giving a descriptive but uncritical review of what the Soviet Union has planned and has been doing in the care of the health of its citizens before the Nazi attack and since. The brochure begins, quite appropriately enough, with the discussion of health protection at the place of work, and then treats briefly such subjects as District Health Centers, Special Care for Women, Child Care, Rural Medical Service, Medical Education, etc.

The reading of this brochure affords one a rather general idea of what the Soviet Union has been trying to do in the way of health conservation. One cannot, however, obtain a clear idea as to how the plans have worked out from the data given. The statistics quoted by the writer are rather crudely formulated and frequently are quite unintelligible.

In the Section "Health Statistics" (page 25), there are some rather meaningless comparisons made between the prevalence of certain diseases in Russia and in the United States. They are meaningless because it is doubtful whether the reporting of morbidities in Russia can possibly approximate that of the United States. There is a marked absence of mortality statistics by which medical service and the state of the health of the people might somehow be gauged.

In these respects then the brochure is seriously deficient.

Part II, which is devoted to Soviet Medical Care in Wartime, makes particularly interesting reading since it describes how the Soviet Union has met the problems of the health care of its vast army.

The pamphlet is tinged with a propagandistic color, which is understandable enough, but one is left with the wish that it had more solid facts and fewer vague generalizations.

IAGO GALDSTON

The Hospital in Modern Society—*By A. C. Bachmeyer, M.D., and Gerhard Hartman, Ph.D. New York: Commonwealth Fund*, 1943. 760 pp. Price, $5.00.

It is interesting to note how exceedingly few textbooks have been written and are available on the subject of hospital administration. This is true in spite of the fact that hospitals represent an investment of over 4 billions of dollars, employ normally a million people, and there is expended annually in excess of 800 millions of dollars for the hospital care of the American people. Surely the enormity of this structure and the tremendous volume of service rendered justifies the ready availability of authoritative material on the essential aspects of hospital service.

The great need for information for the guidance of hospital administrators, their personnel, and others interested in this field, has been met by some of the many articles which appear in the three leading monthly hospital journals, as well as in those dealing with medicine, public health, nursing, etc. The knowledge, experience, and broad background developed over a period of years by the able authors of this book have been applied to the careful compilation of

papers published for more than a decade on the subjects of great interest to those concerned with the varied services involved in hospital management. It is not too much to claim that the list of authors of these articles includes the leaders in the field of hospital administration, as well as in intimately related fields.

The strength of this book lies not only in its inclusion of carefully selected reading material on varied subjects, but also in the provision at the conclusion of each chapter of a substantial list of "References for Further Reading." Totaling 760 pages, divided into 5 parts, and 19 chapters, and including approximately 150 articles and committee reports, it should be a welcome addition to the too meager number of textbooks on this important subject. It should serve as a ready aid and guide to hospital administrators, and their assistants, hospital department heads, trustees, and others concerned with hospital administration.

CHARLES F. WILINSKY

Statistical Abstract of the United States, 1942—*U. S. Department of Commerce, Bureau of the Census (64th ed.). Government Printing Office, Washington,* 1943. 1,097 pp. Price, $1.75.

The 1942 *Statistical Abstract* is the 64th edition of this compendium of the industrial, social, and economic history of the United States as portrayed in figures. In 996 tables, 35 basic subjects such as Vital Statistics, Social Security, Manufactures, Banking and Finance are summarized, an increase of 144 tables over the 1941 edition covering the same subjects. In contrast, the 1920 edition covers 15 basic subjects in 462 tables.

Like the dictionary, this volume has no plot and, like that volume also, one can spend many interesting and enlightening hours with it, for it contains both solidly practical and esoteric information. One finds, for example, that Vital Statistics first appeared as a major subject in 1921 with 12 tables; by 1942 professional and public interest apparently required 22 tables to cover the subject adequately. Social Security first appeared as a major subject in 1939, with 13 tables; in the 1942 edition it has 39 tables.

This reviewer was interested in finding out what was happening in the field of manufacturing in those years when our world was whirling all too ignorantly to its present catastrophe. Between 1937 and 1939—the latest figures available—tobacco, rayons, apparel, both men's and women's, millinery, fur coats, silverware increased in number of workers and value of products, but iron and steel, electrical, agricultural and other machinery, automobiles, railroad equipment, petroleum products, even food products, decreased. Only aircraft and shipbuilding, among the basic manufactures later to be supremely important for war production, were greater in 1939 than in 1937.

As in other recent years, the present volume has a Bibliography of Sources of Statistical Data and each table is annotated as to its source.

MARTHA LUGINBUHL

Trends in Nursing History—*By Elizabeth Marion Jamieson and Mary Sewall (2nd ed). Philadelphia: Saunders,* 1944. 651 pp. Price $3.00.

The second edition of *Trends in Nursing History* brings the events in the nursing world up to date—as of October, 1943. For a rapid review and an encyclopedic type of reference book, this *History* serves. It lacks continuity of subject development and omits reference to some of the important and colorful original sources which make history come alive for the student.

Events, people, and organizations in their proper chronological order are

described without much critical evaluation. The result is a "spotty" narrative, which nevertheless covers an amazing range of topics. Chapters XI–XV offer fairly satisfactory background reading for students ready to tackle current events in class discussion.

DOROTHY DEMING

Clinical Laboratory Methods and Diagnosis—*By R. B. H. Gradwohl. (3rd ed.). St. Louis: Mosby,* 1943. 2 vol. 2,130 pp. 57 color pl. Price, $20.00.

Because of the accumulation of material dealing with laboratory examinations, this work now occupies 2 large volumes containing a total of 2,130 pages, exclusive of 100 pages of index (duplicated in each volume) and accessory pages. It is a veritable encyclopedia of information of value to any person having an interest in diagnostic bacteriology, parasitology, serology or chemistry and related fields. However, it is a work on methodology and is not a textbook for students or a manual for amateurs. It assumes a good knowledge of each subject covered. It includes chapters on hematology, blood grouping and transfusion, blood and urine chemistry, and covers an impressive range of special tests and technics in all of these fields, as well as in vitamin deficiency diseases, atopy, food chemistry, pregnancy, semen appraisal, toxicology, and the like. There is an interesting chapter on detection of crime by laboratory methods, and others on autopsy technic, preparation of museum specimens, and tissue cutting and staining. There is a discussion of penicillin. The chapter on the serology of syphilis is especially extensive and detailed. Practically any laboratory procedure (or an alternative) that is likely to be of value in medicine, toxicology, and related fields is to be found here with pertinent commentary, interpretations, and references to literature both old and recent. There are 57 color plates and scores of instructive half-tones and line drawings. The chapter on supplies and equipment should prove helpful to those setting up new laboratories as well as to others responsible for laboratory work.

It seems probable that no author can prepare such a monumental work free from error or from statements with which some readers will disagree or from basis for criticism as to choice of material. Bacteriologists will find some reason for complaint in these respects, and so doubtless will specialists in other fields. However, the volumes under discussion share these common failings, in no excessive degree, so that the 3rd edition of this book may be recommended as a highly valuable contribution to any technical book shelf. The printers, proofreaders and binders and publishers are to be congratulated on a fine job of book manufacture.

MARTIN FROBISHER, JR.

Occupational Lead Exposure and Lead Poisoning—*A Report Prepared by the Committee on Lead Poisoning of the Industrial Hygiene Section of the American Public Health Association. New York: American Public Health Association,* 1943. 67 pp. Price, $.75.

This publication brings together in a small volume the important facts known about lead exposure and lead poisoning. According to the foreword, "The purposes of this report are (1) to outline practical and effective measures for the recognition and prevention of hazardous lead exposure in industry, (2) to describe satisfactory methods for the differential diagnosis and treatment of lead intoxication, (3) to point out the factual requirements for medicolegal purposes and the means of satisfying such requirements, and (4) to refer the reader to selected sources of more detailed and comprehensive information." These four purposes are

admirably carried out, and the professional ability of the eight men on the committee is excellent evidence that the information is reliable. The appendix gives a very informative classified bibliography for those who wish more details on any phase of the subject. This volume should have a wide circulation among physicians, industrial engineers, and clinical pathologists. FRED J. WAMPLER

Educators Index of Free Materials—*Edited by John Guy Fowlkes. (29th ed.). Randolph, Wis.: Educators Progress League,* 1944. 165 pp.

The *Educators Index of Free Materials* gives clear proof that schools do more than give lip service to the oft-heard doctrine of "enriching the curriculum." The *Index,* of which Dr. John Guy Fowlkes, Professor of Education, University of Wisconsin, is editor, made its first appearance in March, 1937, and is now serving approximately 100,000 teachers in all sections of the country.

Printed on stiff, 3-ply index cards, 5 x 7½", it is revised annually and semi-annually; the present edition of January, 1944, is its 28th revision.

The *Index* covers the whole school curriculum, and the sources of the free material listed include departments of the federal government, foreign governments, agricultural experiment stations and other state institutions, chambers of commerce, travel bureaus, human welfare foundations, and industrial concerns.

Health education is given due place in the *Index.* Also, under Wartime Education are found materials on first aid, guidance, nutrition and diet, physical fitness and recreation; under Applied Arts, home economics, including family relationships and child craft, foods and health, housing. Under Science and under Social Studies are found a variety of materials bearing on the health field. Health films, slides, charts and posters are listed under Visual Education. Altogether, upward of 2,000 annotated materials, free for the asking, are listed in this Educators Index.

Many of the names of the professional health agencies do not appear in the *Index.* The listings under Health Education do not form a well rounded presentation of this subject; obviously, the reason is that free materials on all phases of it are not available. Are we, as professional health educators, doing all that we might to make sure that the schools are well provided with the best there is in this field?

The *Educators Index* is more than a useful tool to schools. It is a valuable stimulus to starting a school library. Moreover, it offers a challenge to the health profession to see to it that good free material is made available to the schools covering the whole field of health education.

LOUISE STRACHAN

Vital Statistics Rates in the United States: 1900–1940—*By Forrest E. Linder and Robert D. Grove; supervision of Halbert L. Dunn, M.D. Bureau of the Census. Washington: Supt. of Documents,* 1943. 1051 pp. Price, $1.75.

This is one of the most useful books that have ever appeared in the field of vital statistics. It is difficult to review because each of the 71 tables presents fascinating statistical vistas that invite exploration. The volume is the more welcome because its predecessor, *Mortality Rates, 1910–1920,* is now over twenty years old.

As to the general structure of the volume, it is to be noted that of the 71 tables, 45 give mortality rates, 9 give natality rates, and the remaining 17 give underlying population tables. Numbers of births and deaths are not given. To have done so would have doubtless

made the volume too bulky. Nevertheless, these numbers can, if necessary, be calculated from the population and rate tables.

Roughly, a fourth of the tables give data for each state. A few show city and county data. Summaries for the expanding registration area are given for nearly all of the tables. Only four of the mortality tables, however, show time series for the registration states of 1900. This, in the opinion of the interviewer, is somewhat regrettable, for expansion of the registration area from the ten original death registration states (plus D. C.) in 1900 to the whole United States in 1933 brought into the area increasing proportions of young, colored, southern, and rural populations. These distortions can to some degree be neutralized by using tables which are specific for age, race, etc. What is more disturbing statistically is that, in expanding, the registration area took in states with less complete birth and death registration and probably poorer diagnostic standards. The book might, therefore, have profited by including more summaries for the registration states of 1900 or 1910.

About half of the tables have a cause of death breakdown. By skillful use of abridged lists it was found possible to pack into this volume a considerable amount of cross tabulation of cause of death with age, race, sex, and month. The occupational breakdown was omitted, probably wisely, because of its limited usefulness in relation to the amount of space demanded. Marital status has also been dropped.

It is, of course, practically impossible to set up an ideal set of tabular patterns until the tables have actually been in use. It may be helpful, therefore, to indicate the information which the reviewer has already sought in the book without success.

1. A tuberculosis time series by sex for single years near 1918.

2. Certain time series for the original registration states by age-cause-race.

3. Data for broad age groups such as 45 or 55 and over. To calculate these from rates and populations would be a considerable chore.

4. Data for age one. The decline in mortality probably was heaviest in that year. The tables give ages 1–4 only as a group.

In general, it appears that cause of death data could profitably have been expanded; and some of the space-consuming state tabulations left to state offices for publication. On the whole, however, reference to the book has been notable for the large proportion of successes rather than by the few failures.

The introductory text covers 119 pages. Although much of this information is extremely interesting, this reviewer questions whether so much general didactic information was necessary or desirable for a book of statistical tables. Philosophical discussions may interfere with proper reference to statistical tables by concealing basic definitions, indexes and explanations. Most of this material really belongs in a textbook.

Chapter 4, giving an informing, though somewhat extended discussion of age adjustment of rates is relevant, in view of the omission of standardized death rates from the volume. Chapter 5, entitled "Description and Explanation of the Tables," is quite essential to the proper use of the volume and the reader is urged to go over this chapter carefully. The ingenious tabular indexes in this chapter should be studied with particular care. These eleven pages should be used more than any others in the book and a permanent book mark or thumb index of some sort is advisable. Some readers may wish to include a column for residence allocation, which unfortunately was not included in the table.

One of the most commendable innovations is that the volume has been reduced to a cover size which, unlike

the earlier mortality volumes, will fit a standard bookcase, is easy to handle, and can be kept or used on a desk without upsetting ink wells or monopolizing undue space. This is fortunate, for every person with any interest in vital statistics will want to keep this excellent little volume constantly within arm's reach. Unless this reviewer is mistaken, the book will exert a profound effect upon public health thought and action for years to come.

A. W. HEDRICH

Rockefeller Foundation—International Health Division, Annual Report, 1942—*New York (49 West 49th Street)*. A limited number of copies available upon request. 194 pp.

This report presents the activities and expenditures of the International Health Division for 1942 under the following headings: Control and Investigation of Specific Diseases, Aid to State and Local Health Services, Public Health Education, and Table of Expenditures. The diseases under investigation and control included yellow fever, influenza, primary atypical pneumonia, typhus fever, rabies, malaria, diphtheria, scarlet fever, tuberculosis, hookworm disease, and syphilis. Studies of nutrition and mental hygiene were also reported.

The work on yellow fever included further studies and extensive use of yellow fever vaccine, with particular attention to post-vaccination jaundice associated with the employment of human serum in the vaccine. Also, the epidemiology of jungle yellow fever in Colombia and northeastern Africa received special attention. The work on influenza was concerned mainly with the immunology of the disease and attempts to develop an effective vaccine. In typhus fever, the relationship between classical and murine strains was studied, and new insecticides against lice were developed. Rabies vaccine prepared by treatment with chloroform was shown to maintain its effectiveness for a least a year for the immunization of dogs. Malaria studies included a search for better chemotherapeutic agents and studies of immunology and histopathology of malaria, and the morphology of *Plasmodium falciparum*. Extensive studies on malaria mosquitoes and their control in Florida, the Caribbean area, and India were also conducted. In diphtheria, the antigenic properties of avirulent bacilli were studied and the identity of the toxin of mitis and gravis strains was established. The work in scarlet fever consisted of the analysis of the studies of strains of hemolytic streptococci causing the disease in Roumania and other parts of the world. In tuberculosis, a study of vaccination in Jamaica using heat killed bacilli was completed showing some apparent degree of protection. The epidemiological study in Williamson County, Tenn., was also continued with emphasis on family transmission, and a study of pulmonary calcification. In the field of nutrition, studies were continued in rural areas of Tennessee, North Carolina, England and Spain, and were extended into Mississippi and Canada.

Aid to state and local health services was given in North Carolina, Mississippi, New York City, and a number of provinces in Canada. Certain Latin American countries and China also received aid in their public health programs.

The schools of public health receiving assistance included those of the University of Michigan, Johns Hopkins, Harvard, Toronto, Sao Paulo, and the National Institute of Health of China. Schools of nursing which received assistance included those of Skidmore College, Venezuela, Panama, Sao Paulo, Brazil, and Lisbon, Portugal.

The Division granted 135 fellowships and training grants to public health personnel chiefly from Latin America.

This brief review indicates the wide range of activities of this most valuable international agency. Although much of its activity has been directed toward the war effort, many constructive peace-time programs have been continued and initiated. The expenditures totalling over $2,300,000 were about equal to those in previous years.

HENRY E. MELENEY

BOOKS RECEIVED

LABORATORY METHODS OF THE UNITED STATES ARMY. Edited by James Stevens Simmons and Cleon J. Gentzkow. 5th ed. Philadelphia: Lea & Febiger, 1944. 823 pp. Price, $7.50.

PRINCIPLES AND PRACTICE OF MEDICINE. By Henry A. Christian. 15th ed. New York: D. Appleton-Century, 1944. 1,600 pp. Price, $9.50.

MICROSCOPIC TECHNIQUE IN BIOLOGY AND MEDICINE. By E. V. Cowdry. Baltimore: Williams & Wilkins, 1943. 206 pp. Price, $4.00.

RORSCHACH'S TEST. By Samuel J. Beck. Vol. 1. New York: Grune & Stratton, 1944. 223 pp. Price, $3.50.

THE JEWS AND MEDICINE. By Harry Friedenwald. Vol. I. Baltimore: Johns Hopkins Press, 1944, pp. 1–390. Price, $3.75.

THE JEWS AND MEDICINE. By Harry Friedenwald. Vol. II. Baltimore: Johns Hopkins Press, 1944, pp. 391–817. Price, $3.75.

FOUNDATIONS OF NUTRITION. By Mary Swartz Rose. Revised by Grace MacLeod and Clara Mae Taylor. 4th ed. New York: Macmillan, 1944. 594 pp. Price, $3.75.

THE ART AND SCIENCE OF NUTRITION. By Estelle E. Hawley and Grace Carden. 2nd ed. St. Louis: Mosby, 1944. 668 pp. Price, $3.75.

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A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

First on Your Reading List—Last fall a commission undertook a clinical trial of inactivated vaccine of influenza virus A and B, upon 12,500 army S. P. T.'s—a highly stable population. Vaccination performed just before or even after the onset of the epidemic protected at a ratio of 3.2 to 1 over the controls. (In some of the units the ratio was 5 or 6 to 1.) The effect of the vaccine becomes evident in about a week but the duration of the protective values has not been determined. More findings are promised.

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ASSOCIATION NEWS

SECOND WARTIME PUBLIC HEALTH CONFERENCE AND
SEVENTY-THIRD ANNUAL BUSINESS MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION
New York, N. Y., October 3–5, 1944
Headquarters: Hotel Pennsylvania

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Lloyd B. Sharp, Ph.D., 14 W. 49th, Room 806, New York, N. Y., Exec. Director, Life Camps, Inc.

Hazel J. Twombly, M.A., 136 Locust St., Flora Park, N. Y., Instructor in Child Hygiene and Personal Hygiene, Brooklyn College

Hoke Wammock, M.D., Jeanes Hospital, Fox Chase, Philadelphia, Pa., Chief of Staff

Public Health Nursing Section

Ruth E. Baker, M.A., Box 81, Millbrook, N. Y., Nurse Director, Millbrook Visiting Nurse Assn.

Ada S. Callahan, 119 S. Burrowes St., State College, Pa., Community Public Health Nurse, American Red Cross

Margueritte Cunningham, 500 W. 29th St., Austin, Tex., Field Supervising Nurse, State Dept. of Health

Katherine Delsing, R.N., Box 1282, Huron, S. D., Field Nurse, Crippled Children, State Board of Health

Margaret Ervin, Bellemead Coal Co., Sabine, W. Va., Nurse

Roberta E. Foote, R.N., M.A., 4961 Laclede Ave., St. Louis, Mo., Educational Director, St. Louis County Health Dept.

Anne C. Gring, 65 Chestnut, Montclair, N. J., Director, Bureau of Public Health Nursing, Health Dept.

Margaret Hamlin, R.N., Newton County Health Unit, Neosho, Mo., Field Advisory Nurse, State Board of Health

Dell R. Harper, Box 86, Orangeburg, S. C., District Supervising Nurse, State Board of Health

Ona Haslebacher, 6 Jones St., New York 14, N. Y., Staff Nurse, Henry Street Visiting Nurse Service

Lillian Hiss, R.N., 2017 Bolton St., Baltimore, Md., Public Health Nurse, Baltimore County Health Dept.

Alma T. Horde, R.N., 402 Court House, Minneapolis, Minn., Director and Supervisor, Hennepin County Public Health Nursing Service

Margaret M. Hunsicker, R.N., M.N., 126 Hillsdale St., Hillsdale, Mich., Public Health Nurse, Hillsdale County Health Dept.

Myra N. Johnson, 905 Summit Ave., New York 52, N. Y., Staff Nurse, Community Service Society

Cathryn Kurtagh, 1600 Constance St., New Orleans 13, La., Supervising Public Health Nurse, City Health Dept.

Helen Martin, 1539 Yarmouth Ave., Cincinnati, Ohio, Director, Visiting Nurse Assn.

Lena Maxwell, R.N., 807 N. Main, Bloomington, Ill., Director, School of Nursing, Mennonite Hospital

Agnes I. McKenna, 1757 Gilpin St., Denver, Colo., District Advisory Nurse, Division of Public Health Nursing, State Health Dept.

Mae B. Packer, R.N., 2129 Santee Ave., Columbia 41, S. C., State Consultant Nurse, Div. of Preventable Diseases, State Board of Health

LaVerne C. Rystrom, 329 S. Plumas St., Willows, Calif., County School Nurse, Glenn County School Dept.

Iva Van Schoick, 962–42nd St., Sacramento 16, Calif., Public Health Nurse, Sacramento County Health Dept.

Margaret L. Shetland, R.N., M.A., 501 W. 120th St., New York, N. Y., Instructor in Nursing Education, Teachers College

Ruth A. Smith, R.N., Hillsdale County Health Dept., Hillsdale, Mich., Staff Nurse

Ethel D. Sparks, 316 N. 8th St., LaFayette, Ind., Visiting Nurse, Flower Mission

Blanche R. Speec, 305 S. Waccamaw Ave., Columbia, S. C., District Supervisory Nurse, State Board of Health

Dorothy Wheeler, R.N., 654 Madison Ave., New York, N. Y., Exec. Sec., New York City Nursing Council for War Service

Audie C. Wilkinson, R.N., 1221 W. Blvd., Rapid City, S. D., District Supervisor, State Board of Health

Epidemiology Section

Capt. Louis N. Altshuler, M.C., 1200 SCSU, Fort Jay, Governors Island, N. Y., Asst. to Medical Inspector

Glenn H. Baird, M.D., 1006 E. Broad St., Richmond 19, Va., Venereal Disease Control Officer, Dept. of Public Health

A. A. Gilman, M.D., 101 Grove St., San Francisco, Calif., Epidemiologist, San Francisco Health Dept.

Lt. Comdr. Walter T. Kees, M.C., N.C.T.C. Bld. S-25, Davisville, R. I., Epidemiologist

J. Austin Kerr, M.D., 1392 University Ave., Berkeley 2, Calif., Epidemiologist, Research Laboratory, State Dept. of Public Health

Jose H. Rodriguez-Cabrera, Pinto a Gobernador 145, Caracas, Venezuela, S. A., Medico Epidemiologo, Unidad Sanitaria de Caracas

Margaret Smith, M.D., Sydenham Hospital, Baltimore, Md., Medical Director, City Health Dept.

Christopher J. Stringer, M.D., 623 Kensington Ave., East Lansing, Mich., Medical Director, Ingham Sanatorium

School Health Section

Mrs. Russell Arnold, R.N., 32277 Lake Rd., Avon Lake, Ohio, Member, Lorain County Health Board

Loula B. Creasy, 15 Lafayette Ave., Lynbrook, L. I., N. Y., School Nurse Teacher, Setauket High School

Marian V. Fegley, R.N., 348 W. 23rd St., New York 11, N. Y., Supervising Nurse and Nurse Consultant, School Health Service, Dept. of Health

Alice Hagelshaw, R.N., 27700 Gratiot, Roseville, Mich., Supervisor, Detroit Visiting Nurse Assn.

Agnes Hamilton, R.N., 80 Woodrow St., West Hartford, Conn., Supervisor of School Nurses and Staff Nurse, Hartford Board of Education

Ruth V. Hemenway, M.D., 38 Village Hill, Williamsburg, Mass., School Physician

Dorothy A. Huskey, M.S., Martel, Tenn., Health Education Coördinator, Anderson County Health Unit

Ben W. Miller, Ph.D., 1201 Sixteenth St., N.W., Washington, D. C., Exec. Sec., American Assn. for Health, Physical Education and Recreation

Hyman Millman, M.D., Mohegan Lake, N. Y., School Physician

W. Carson Ryan, Ph.D., Box 826, Chapel Hill, N. C., Member, Administrative Board, School of Public Health, Univ. of North Carolina

Elizabeth M. Semenoff, R.N., M.A., 3051 Idaho Ave., Washington, D. C., Director, Child Health Education, District of Columbia Tuberculosis Assn.

Dental Health Section

Polly Ayers, D.D.S., 74 Fenway, Boston 15, Mass., Student, Harvard School of Public Health

Charles F. Bodecker, D.D.S., 630 W. 168th St., New York 32, N. Y., Professor of Dentistry, Columbia University

Alonzo Garcelon, D.D.S., State House, Augusta, Me., Director, Div. of Dental Health, Bureau of Health

Ray A. Jacobson, D.D.S., 2404 Midway Blvd., Wausau, Wis., Director of School Health for Wausau Schools, Board of Education

Ewing C. McBeath, M.D., D.D.S., 630 W. 168th St., New York, N. Y., Professor of Dentistry, Columbia University

Charles A. Sweet, D.D.S., 2940 Summit St., Oakland 9, Calif., Chairman, California State Council on Dental Health

Fannya Zacharoff, D.D.S., Woodridge, N. Y.

Unaffiliated

Charles H. Crownhart, 917 Tenney Bldg., Madison 3, Wis., Sec., State Medical Society of Wisconsin

James M. Cunningham, M.D., Bureau of Mental Hygiene, State Health Dept., Hartford, Conn., Director

Laurence A. Fagan, 142 Allen Place, Hartford, Conn., Business Manager, State Dept. of Health

Morris Hinenburg, M.D., 555 Prospect Place, Brooklyn, N. Y., Exec. Director, The Jewish Hospital

Ruth H. Monroe, Station A, Box K, State Dept. of Health, Hartford, Conn., Chief, Div. of Licensure and Registration

V. C. Morgan, 4706 S.E. 43rd Ave., Portland, Ore., State Sanitarian, State Board of Health

J. Allen Scott, D.Sc., Dept. of Prev. Med., Univ. of Texas, Galveston, Tex., Assoc. Professor

Margaret P. Stimmel, M.S., 416 Locust, Fort Collins, Colo., Instructor in Bacteriology, Colorado State College of A. & M.

Russell W. Strandtmann, M.S., Medical College, Galveston, Tex., Asst. Professor of Entomology, Dept. of Preventive Medicine and Public Health

Dorothy Sutherland, 270 Union Ave., Rutherford, N. J., Editor of R. N. A Journal for Nurses

Allan C. Thurman, M.D., M.P.H., 1757

Cornell Circle, Salt Lake City, Utah, Director, Crippled Childrens Div., State Dept. of Health

O. Dorothy Yeakel, Box 264, Hudson Falls, N. Y., Exec. Sec., Washington County Tuberculosis and Public Health Committee

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NATIONAL HEALTH HONOR ROLL AWARDS FOR 1943

Fifty-three communities have been granted awards in the National Health Honor Roll for 1943, according to a recent announcement by the sponsoring agencies, the United States Chamber of Commerce and the American Public Health Association. This recognition for progress in community health protection has been made on the basis of *Evaluation Schedules* submitted during March and April, 1944, and covering the various health activities throughout the year 1943.

The cities which attained the 1943 National Health Honor Roll are:

Baltimore, Md.
Detroit, Mich.
Evanston, Ill.
Greenwich, Conn.
Hackensack, N. J.
Hartford, Conn.
Houston, Tex.
Jackson, Mich.
La Salle-Peru-Oglesby, Ill.
Little Rock, Ark.
Madison, Wis.
Milwaukee, Wis.
Newark, N. J.
Newton, Mass.
Pasadena, Calif.
Peoria, Ill.
Racine, Wis.
Reading, Pa.
Rochester, Minn.
San Jose, Calif.
Schenectady, N. Y.
Stamford, Conn.

The counties which attained the 1943 National Health Honor Roll are:

Allegan County, Mich.
Arlington County, Va.
Austin-Travis County, Tex.
Barry County, Mich.
Calhoun County, Mich.
Coahoma County, Miss.
Davidson County, Tenn.
Dickinson County, Mich.
Eaton County, Mich.
El Paso City-County, Tex.
Fayette County, Ky.
Forsyth County, N. C.
Gibson County, Tenn.
Glynn County, Ga.
Ingham County, Mich.
Jackson County, Ore.
Jones County, Miss.
Lauderdale County, Miss.
Leflore County, Miss.
Los Angeles County, Calif.
Louisville-Jefferson County, Ky.
Madison County, Ky.
Mason County, Mich.
Memphis-Shelby County, Tenn.
Menominee County, Mich.
Midland County, Mich.
Saginaw County, Mich.
Santa Barbara County, Calif.
Spartanburg County, S. C.
Van Buren County, Mich.
Washington County, Miss.

Appropriate plaques will be forwarded to the communities shortly after June 1. Prior to this date interpretative letters discussing the details of individual programs will be forwarded to each community. The cancellation of the 1944 annual meeting of the United States Chamber of Commerce, scheduled originally for the first week of May, has necessitated a change in the usual custom of presenting the awards on this occasion. The American Public Health Association will give public recognition to the winning communities at the annual meeting in New York City the first week in October.

Evaluation Schedules showing the annual health inventory for 1943 were received from 190 communities.

The National Health Honor Roll is financed jointly by the W. K. Kellogg Foundation and the Metropolitan Life Insurance Company.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

POSITIONS AVAILABLE

Wanted: A physician trained in tuberculosis to assume administrative control of the Bureau of Tuberculosis in an eastern city of 200,000 population. Salary $4,500–$5,031 plus cost of living adjustment. Address **Box B**, Employment Service, A.P.H.A.

Sanitarian wanted: Preferably with Bachelor's degree or engineering degree, plus public health experience or training. Must have own car. Applicant with lower qualifications will be offered an opportunity to take a short, free indoctrination course. Salary $1,920 per year with travel allowance of $50 per month, if qualified. Apply Dist. Dept. of Health, No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Pediatrician to supervise medical care of children at cerebral palsy center being established by private institution in coöperation with Illinois Division of Services for Crippled Children. Salary commensurate with experience and training. For further information write Lawrence J. Linck, Director, Division of Services for Crippled Children, 1105 So. Sixth St., Springfield, Ill.

Wanted: Public health physicians in Texas. George W. Cox, M.D., State Health Officer, Austin, Tex.

Hawaiian Territorial Board of Health seeks trained engineer to supervise rodent plague control program. Salary range from $331.67 to $398.33 per month subject to retirement deductions plus bonus. Position under Territorial civil service system with classification of P-4. For further details address A.P.H.A. Employment Service.

Wanted: Physical therapist by Crippled Children's Division. Should be graduate of a school of nursing or of college, with a major in physical education or science; have completed a course in physical therapy; should have had experience in physical therapy, preferably with children. Write for application blank to Merit System Council, 416 Henry Building, 309 S.W. 4th Ave., Portland 4, Ore.

Psychiatric case worker desired for mental hygiene clinic, Department of Health, Peoria, Ill.

Senior Sanitarian, Alaska Health Department. Minimum requirements 2 years college, 6 months public health course, 2 years' experience. Two additional years' experience acceptable instead of each year college. Monthly salary $235–$265. Mary B. Pool, Alaska Merit System, Juneau.

Michigan announces civil service positions now open for orthopedic public health nurse, Grades II and III classes with the Michigan Crippled Children's Commission. Salary range: Grade II $230 to $270 per month; Grade III $280 to $340 per month. Grade II not under 23, Grade III not under 25. Must have completed course in orthopedic nursing or physical therapy in approved school. For Grade III position a full-time course of at least 9 months' duration is required. Must have 3 years' experience in public health nursing, one year of which shall have been in supervisory capacity. For Grade III position one additional year of nursing and one additional year of supervisory experience required. Eligibility for certificate in public health nursing and registration as a nurse in Michigan. For further information write Michigan Civil Service Commission, 310 No. Grand Ave., Lansing 4, Mich.

Wanted: Sanitary engineer or chemist to assist in stream pollution survey and later in study of sewage treatment. Should be qualified to perform chemical and bacteriological analyses of water and sewage and chemical analyses of industrial wastes. Nine months employment with possibility of indefinite continuation, particularly if person is willing to do some other types of analytical work, including coal analysis. Salary $175–$250 per month depending on qualifications.

Women considered. Address communications to Prof. Gilbert H. Dunstan, Dept. of Sanitary and Public Health Engineering, University of Alabama, Box 1996, University, Ala.

Industrial Hygiene Toxicologist. Calls for person of chemical or chemical engineering background. Position, supervising of chemical work of industrial hygiene service and industrial hygiene laboratory; designing special apparatus for field studies on occupational disease problems; conducting field and laboratory analyses of toxicological exposures in industry; keeping records, interpreting results and preparing records. Requirements, knowledge of chemical laboratory methods and equipment; procedures for qualitative and quantitative analysis of organic and inorganic chemistry; knowledge of chemical methods of determining toxic materials in industry; familiarity with petrographic methods of mineralogical analysis. Immediate temporary appointment will be made, to be followed later by civil service examination to determine permanent status. Salary $2,900 base, plus $100 a year war adjustment, or total of $3,000 per year. Travel expenses also allowed. Must be U. S. citizen. Resident of any state may apply. Write J. Lynn Mahaffey, M.D., Director of Health, State Department of Health, Trenton 7, N. J.

New Mexico Department of Public Health announces examinations to be held for the following positions:

Position	*Monthly Salary Range*
Director of Public Health Laboratories	$300–$400
Senior Bacteriologist	175– 225
Senior Serologist	175– 225
Supervisor of Laboratory Maintenance	150– 175
Senior Assistant Bacteriologist	145– 175
Senior Assistant Serologist	145– 175
Junior Bacteriologist	115– 135
Junior Serologist	115– 135

Residence in the state not required. Persons interested may make application by May 15, to the Merit System Supervisor, **Box 939**, Santa Fe, N. M.

Wanted: Health Commissioner, combined Health District, Delaware, Ohio. Model organization, University community. Salary $3,600 plus travel. Address: George T. Blydenburgh, M.D., Deputy Health Commissioner, Delaware, Ohio.

Wanted: Public Health Nurse. Salary $175 per month and full maintenance, plus $25 per month for car expense. Must furnish own car. Write Paul D. Crimm, M.D., Director Boehne Tuberculosis Hospital, Evansville 12, Ind.

City of 70,000, southeastern U. S., seeks qualified health commissioner between the ages of 30 and 45, draft exempt. Salary $4,500 plus auto allowance of $300 per year. **Box V**, Employment Service, A.P.H.A.

Assistant Sanitarian in well established Ohio department of health. Minimum experience 2 years required. Merit system prevails. Salary $1,800–$2,400. Write **Box K**, Employment Service, A.P.H.A.

Wanted: Bacteriologist to conduct virus laboratory in the Laboratory Section of the Health Division, City of St. Louis. Applicant must have graduate degree with research and practical experience in virology. Salary range from $220 to $360 a month, depending upon ability. Position under Civil Service. Write **Box W**, Employment Service, A.P.H.A.

Wanted: Statistical clerk, preferably with college degree and experience in health education, to study and analyze vital statistics in suburban and rural county adjacent to Washington. Special emphasis on relation to health department services and participation in Health Honor Roll. Address V. L. Ellicott, M.D., Dr.P.H., Montgomery Co., Rockville, Md.

Wanted: Medical Social Worker for Dept. of Health, Peoria, Ill. Address Director Maternal and Child Health, Dept. of Health, Peoria, Ill.

Wanted: Physician in eastern city of 200,000 population as Director of Bureau of Maternal and Child Hygiene. Salary $4,500–$5,031, plus cost of living adjustment. Address **Box C**, Employment Service, A.P.H.A.

Wanted: A physician with venereal disease control experience to assume directorship of the Bureau of Venereal Diseases in a large northeastern city. Salary $4,500–$5,000 per year, plus cost of living adjustment and travel allowance. **Box E**, Employment Service, A.P.H.A.

Wanted: Physician (male), American citizen, draft exempt, trained in pediatrics, for a 3 year position as chief resident and research assistant in fine pediatric tuberculosis hospital, New York. Good salary and maintenance. Only one intensely interested in research need apply. Send full details of qualifications and photograph. **Box R**, Employment Service, A.P.H.A.

Wanted: X-ray technician to travel with portable x-ray unit taking chest x-rays at tuberculosis case finding clinics. Includes both industrial and school surveys. Salary $35 per week plus travel and maintenance when away from headquarters. Address **Box M**, Employment Service, A.P.H.A.

Wanted: Resident physician for plant in South America. Must have thorough knowledge of malaria, tropical medicine, and vector control. Must be eligible for licensure in British Colony. Address **Box H**, Employment Service, A.P.H.A.

Physician wanted as Director of Maternal and Child Health in western county health department. Preferably with training in pediatrics and venereology. Some venereal disease control work also. Man preferred but woman considered. Must be in good health. Salary $4,500 per year with car and expenses furnished. Position for duration of war. Address **Box S**, Employment Service, A.P.H.A.

Tuberculosis Association in large western city seeks a trained and experienced health education director, a director of medical social work, and a public health nurse supervisor. Attractive positions now open in agency with a dynamic program closely related to official groups. Address **Box D**, Employment Service, A.P.H.A.

U. S. Indian Service seeks physicians for service in the United States and Alaska. Address Office of Indian Affairs, Health Division, Merchandise Mart, Chicago 54, Ill. Application blanks will be furnished upon request.

Wanted: Competent, thoroughly trained bacteriologist, woman or draft exempt man, to take complete charge of splendidly equipped small industrial laboratory, Connecticut location, country environment, pleasant surroundings, excellent working and living conditions. This is a permanent post-war position. Write full details including minimum salary requirement to start in first letter. All letters including adequate vitae and photo will be promptly acknowledged. Write **Box A**, Employment Service, A.P.H.A.

St. Louis, Mo., Health Division, Industrial Hygiene Service, seeks two industrial hygienists, either engineers or chemists. Salaries $225 to $250 per month depending on qualifications and experience, plus travel allowances. Address Robert M. Brown, Public Health Engineer, 64 Municipal Courts Bldg., St. Louis 3, Mo.

Wanted: Medical technologists, also bacteriologist for 550 bed approved California hospital. Give full particulars and state salary desired. Address W. O. Brown, M.D., Kern General Hospital, Bakersfield, Calif.

Wanted: Medical technologist, woman, trained in bacteriology of milk and water, diagnostic cultures, routine blood chemistry and tissue work—paraffin and frozen sections. County position under Civil Service located in the East. Salary to be arranged. Write **Box L**, Employment Service, A.P.H.A.

Wanted: M.D., instructor in preventive medicine and public health, with interest particularly in biostatistics and industrial hygiene. Salary approximately $4,000. Write **Box T**, Employment Service, A.P.H.A.

Local Health Consultant, State of Connecticut. A competitive examination open to all citizens of the United States has been announced by the Personnel Department, State of Connecticut, Hartford. Position of local health consultant in the State Department of Health carries a salary of $5,100–$5,700 per annum. Requirements include medical degree, minimum of 5 years' employment (or public health degree and 3 years' employment). Persons interested should communicate with the Personnel Department, State Capitol, Hartford, Conn. Closing date May 31.

Public Health Nurses Wanted: Three staff positions available. Generalized program. Annual salary $2,220 to $2,400 plus travel for use of own car. Address Miss Lorilla Britell, Supervisor, King County Health Dept., County-City Building, Seattle 4, Washington.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK 19, N. Y.

In view of the current active demand for trained and experienced persons in public health, it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

ADMINISTRATIVE

Physician, age 37, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. **A-476**

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as county or city health officer or director of a bureau. **A-506**

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. **A-505**

Woman physician, experienced in public health education and school health service administration and supervision, seeks full- or part-time position, preferably southeastern New York State. **A-511**

HEALTH EDUCATION

Woman with background of health education and public health nursing, experienced as teacher, supervisor, and writer, seeks teaching position of responsibility. **H-507**

LABORATORY

Research bacteriologist. Unusually trained and experienced woman bacteriologist and serologist now occupying responsible position in state laboratory seeks research work of permanent character. **L-468**

Water chemist, bacteriologist, M.S. degree in Sanitary Chemistry. Age 36, draft exempt. Eight years' experience in state laboratory working on water, milk and sewage. Prefers Midwest or Pacific Northwest location. **L-469**

ENGINEER

Well qualified public health engineer seeks responsible position in New York metropolitan area. **E-480**

MISCELLANEOUS

Public Health Nurse. B.S. in nursing, William and Mary College, age 53, seeks position as coördinator of public health nursing, educational director, or director student nurse public health program. Prefers Middle Atlantic States. **M-452**

NEWS FROM THE FIELD

UNIVERSITY OF MICHIGAN INSTITUTE ON DENTAL HEALTH ECONOMICS

The School of Public Health of the University of Michigan has announced plans for an Institute on Dental Health Economics to be held at Ann Arbor throughout the week of June 26 to July 1.

It is the purpose of this Institute to bring together a group of outstanding leaders in the field of dental health under the chairmanship of Dr. Kenneth A. Easlick, Associate Professor of Public Health Dentistry, in order that they may share their experiences and pool their thoughts on the improvement of the dental health of the American people. It is planned to review briefly the social and economic background of health problems, and against this setting to develop a comprehensive understanding of the dental problem. Minimum standards of dental health service will be considered and concise information will be presented to assist in the development of a program to solve the dental problem at this level of standards. It is intended that the work of the Institute will culminate in concrete proposals for a dental health program designed to meet the challenging needs which are known to exist.

The following are among the speakers who will participate in the formal program:

R. C. Williams, M.D., Director, Division of Medical Services, U. S. Public Health Service
John W. Knutson, Dental Surgeon, U. S. Public Health Service
Henry Klein, Senior Dental Officer, U. S. Public Health Service
Nathan Sinai, Dr.P.H., Professor of Public Health, University of Michigan
Harold Y. McClusky, Ph.D., Professor of Educational Psychology, University of Michigan
Melvin L. Dollar, Public Health Economics, University of Michigan
Marcus L. Ward, D.D.S., Jonathan Taft Professor of Dentistry, University of Michigan
Don W. Gullett, D.D.S., Secretary, Canadian Dental Association
Harold Hillenbrand, D.D.S., Associate Editor, *Journal of the American Dental Association*
John Oppie McCall, D.D.S., Director, Guggenheim Dental Clinic, New York, N. Y.
John T. O'Rourke, D.D.S., Dean, School of Dentistry, University of Louisville
Walter H. Philips, D.D.S., Director, Dental Division, Detroit Department of Public Welfare
R. M. Walls, D.D.S., Member of Committee on Economics, American Dental Association
J. M. Wisan, D.D.S., Director, Dental Health Division, New Jersey State Department of Health

Because of the nature and purpose of the Institute registration must be limited to fifty members. Although an attempt will be made to obtain a geographic distribution of the applicants, primary consideration will be given to the order in which applications are received. The registration fee will be $10. Requests for application blanks should be sent promptly to Dr. Kenneth A. Easlick, School of Public Health, Ann Arbor, Mich.

MEETING ON PUBLIC HEALTH BROADCASTS

The Institute for Education by Radio has been held annually for fourteen years under the auspices of Ohio State University. Last year for the first time a meeting on the subject of public health broadcasts was included. David Resnick, Director of Public Relations of the National Society for the Prevention of Blindness, presided and among the participants were Daniel C. McCarthy, of the National Tuberculosis Association, Dr. E. R. Coffey, U. S. Public Health Service, Thomas C. Edwards, Office of the Coördinator of Inter-American

Affairs, Dr. Iago Galdston, New York Academy of Medicine, Dr. Robert G. Paterson, Ohio Public Health Association, and Muriel Steward, Hennepin County Tuberculosis Association. Now it is announced that another section meeting on public health broadcasts will be part of the Fifteenth Institute for Education by Radio, to be held in Columbus, Ohio, May 5–8. This session is scheduled for Saturday evening, May 6. Mr. Resnick is Chairman and Dr. Coffey is discussion leader. Directors of health education from governmental and voluntary health agencies and executives of broadcasting networks and local radio stations will participate in the discussions.

DR. PARRAN REAPPOINTED SURGEON GENERAL

Upon nomination by President Roosevelt, Thomas Parran, M.D., who for eight years has been Surgeon General of the U. S. Public Health Service, was recently nominated for a third term of four years and was immediately confirmed by the Senate.

CHILDREN'S BUREAU COMMISSION ON CHILDREN IN WARTIME

Ruth Houlton, R.N., Director of the National Organization for Public Health Nursing represented the American Public Health Association at the meetings of the Children's Bureau Commission on Children in Wartime on March 17 and 18 in the absence of Dr. Atwater, and reports as follows:

The Children's Bureau Commission on Children in Wartime appointed by Katherine Lenroot, Chief of the Children's Bureau, in February, 1942, when it met to adopt A Children's Charter in Wartime met again in Washington, D. C., on March 17 and 18, to review its activities and to consider goals for the future.

A large proportion of the more than 75 members of the Commission representing many official and voluntary agencies interested in the health and welfare of children attended the meeting, and participated in the discussion. Physician, dentist and nurse members of the Commission include:

Fred L. Adair, M.D., American Committee on Maternal Welfare
Frederick H. Allen, M.D., Philadelphia Child Guidance Clinic
Reginald M. Atwater, M.D., American Public Health Association
Leona Baumgartner, M.D., New York City Department of Health
Alice Drew Chenoweth, M.D., Kentucky State Department of Health
Paul B. Cornely, M.D., Howard University, Washington, D. C.
Nicholson J. Eastman, M.D., Johns Hopkins Hospital
Franklin P. Gengenbach, M.D., President, American Academy of Pediatrics
Henry F. Helmholz, M.D., The Mayo Clinic
Ruth Houlton, R.N., National Organization for Public Health Nursing
Emory W. Morris, D.D.S., W. K. Kellogg Foundation
Ellen C. Potter M.D., New Jersey State Department of Institutions and Agencies
Mabel K. Staupers, R.N., National Association Colored Graduate Nurses
George S. Stevenson, M.D., National Committee for Mental Hygiene
Felix Underwood, M.D., State Health Officer, Mississippi

Leonard W. Mayo, Dean, School of Applied Social Sciences, Western Reserve University, was reëlected Chairman.

An interesting feature of the meeting was a panel of 12 boys and girls who discussed, "Next Steps in Planning for Children and Youth." The discussion leader was C. B. Loomis, head, Department of Sociology, Piedmont College, Georgia. Participants came from all parts of the country and included college and high school students as well as workers in textile and defense industries. Among them were a Chinese girl and a Negro boy and girl. In the President's Proclamation of May 1 as Child Health Day, youth forums of this kind are encouraged.

The "Goals for the Future as We Go from War to Peace" adopted by the Commission include the following emphases on health:

Extension of health service and medical care to assure access to adequate care for all mothers and children

Regulation of child labor and safeguarding of youth in wartime employment

Safeguarding family life in wartime during demobilization and in the post-war period

Review and revision of legislative safeguards and standards relating to children in preparation for the 1945 sessions of the legislatures, in the light of these goals for children

Sharing of the public responsibility for the health, education, and welfare of children by federal, state, and local authorities, with recognition of the primary responsibility of the state and local units, the importance of providing federal funds for local services through grants-in-aid to appropriate State agencies, and with the removal of residence restrictions in the selection of personnel for such programs

Provision for the training of professional personnel required for services for children and youth and for the preparation of volunteers to assist in rendering such services

Increased opportunities for youth to share in the planning and development of programs—local, state, and national, and international—for the benefit of youth

Education of parents, youth, and all citizens concerning the importance of providing full security and opportunity for children for the sake of their own happiness and well-being and for the future of the nation

U. S. PUBLIC HEALTH SERVICE REORGANIZES THE INDUSTRIAL HYGIENE DIVISION

The reorganization of the Public Health Service effected by action of the 78th Congress became operative on December 30, 1943. Under the new plan of administration, the present structure of the Industrial Hygiene Division, with the exception of the Research Section, becomes a Division of the Bureau of State Services. The Research Section remains in the National Institute of Health and will be known as the Industrial Research Laboratory.

Medical Director J. G. Townsend, who heads the Division, has announced the following personnel in charge of the Sections and Units which comprise the reorganized Industrial Hygiene Division:

Dermatoses Section (formerly the Dermatoses Investigation Section) — Medical Director Louis Schwartz

Field Operations Section (formerly the States Relations Section)—Senior Sanitary Engineer J. J. Bloomfield

Medical Unit—Surgeon W. C. Dreessen

Engineering Unit — Sanitary Engineer (R) Harry E. Seifert

Statistical Unit—Principal Statistician W. M. Gafafer

Chemical Unit—Senior Chemist F. H. Goldman

INTERNSHIPS IN PUBLIC HEALTH

The following announcement is quoted from the issue of *New York State Health News* for March 6:

"The State Department of Health will consider applications from young physicians interested in securing training in the field of public health. Applicants must possess certain basic qualifications among which are United States citizenship, graduation from a medical school approved by the American Medical Association, and license to practise medicine in New York State or eligibility to take the examination to obtain such a license.

"The training consists of 6 to 12 months' field experience followed by an academic year at a postgraduate school of public health.

"Physicians interested in this training should write to the State Department of Health, Albany 1, N. Y., or communicate with the nearest district state health officer. If the applicant desires to attend school this fall, his field training must begin in the near future. Immediate application is advised."

MT. SINAI HOSPITAL PLANS POST-WAR EXPANSION

Mt. Sinai Hospital, New York, N. Y.,

has announced the appointment of George Baehr, M.D., who recently has served as chief medical officer of the Office of Civilian Defense, and as Medical Director in the U. S. Public Health Service (R), as Director of Clinical Research. He will coördinate the hospital's clinical research activities, the work of the laboratories, and the development of the use of the hospital's facilities.

Isidore Snapper, M.D., formerly of Amsterdam, Netherlands, and Peking, China, was appointed director of graduate medical education for the hospital.

PUERTO RICO PUBLIC HEALTH ASSOCIATION

At its Annual Meeting held in February, the Puerto Rico Public Health Association elected the following new officers:

President—Oscar Costa-Mandry, M.D.
President-elect—Jose N. Gandara, M.D.
Vice-President—Ezequiel Martinez-Rivera, M.D., M.S.P.H.
Secretary—Guillermo Arbona, M.D., M.P.H.
Treasurer—Celia Guzman, R.N., M.A.
Representative to A.P.H.A. Governing Council—Pablo Morales Otero, M.D.

PERSONALS

Central States

JOHN K. ALTLAND, M.D., M.S.P.H.,† Hastings, Mich., was to resume his position as Director of the Barry County Health Department on March 16.

JAMES A. CAMPBELL, M.D., Health Director of Scott County, Kan., has been appointed to a similar position in Mason County.

B. RUSSELL FRANKLIN, C.P.H.,† Chief Sanitarian of the Lorain County District Department of Health, Oberlin, Ohio, has been granted a leave of absence for the duration to accept a commission as Lieutenant (jg) in the U. S. Navy.

FRED H. RHODES, M.D., has been appointed Health Officer of Washington County, Kan.

ORLIN P. WOOD, M.D., Marysville, Kan., has been appointed Health Officer of Marshall County.

RALPH W. G. WYCKOFF, PH.D.,† has recently joined the staff of the University of Michigan School of Public Health, Ann Arbor, Mich., to work in the virus laboratory on biophysical methods.

Eastern States

L. VAND. CHANDLER,* Health Officer of Hackensack, N. J., was recently cited by the Hackensack Chamber of Commerce for his work as Chairman of the Permanent War Finance Committee during the 4th War Loan campaign. According to the announcement, Mr. Chandler through his own efforts sold $530,000 in War Loan Bonds.

N. STANLEY LINCOLN, M.D.,† who has been Superintendent of the Mt. Morris Tuberculosis Hospital, Mt. Morris, N. Y., for the past 9 years, has been transferred by the Division of Tuberculosis of the New York State Department of Health to the position of Superintendent of the Hermann M. Biggs Memorial Hospital, Ithaca, N. Y., succeeding JOHN K. DEEGAN, M.D.,† who resigned to enter military service.

JANICE RAFUSE, M.D.,† is now a member of the staff of the Division of Child Hygiene of the Massachusetts Department of Public Health, Boston, Mass.

ARTHUR M. STOKES, M.D., a member of the staff of the Homer Folks Tuberculosis Hospital, Oneonta, N. Y., has been transferred by the Division of Tuberculosis, New York

* Fellow A.P.H.A.
† Member A.P.H.A.

State Department of Health, to become Superintendent of Mt. Morris Hospital at Mt. Morris.

JAMES WAILS, M.D., M.P.H.,* has been appointed Commissioner of Health for the City of Worcester, Mass. Prior to this appointment Dr. Wails was Director of the Nashoba Health Unit, Ayer, Mass.

HARRY C. WYER, M.D., who was formerly a Lt. Col. in the United States Army and Professor of Preventive Medicine and Military Tactics at the Boston University Medical School, has been appointed Health Officer of the South Metropolitan District of the Massachusetts Department of Health, Boston, Mass.

Southern States

THOMAS P. ANDREWS, M.D., has resigned as Health Officer of Brownsville, Tex.

JAMES A. MCCALLUM, M.D., C.P.H.,† Centerville, Md., has been appointed Health Officer of Queen Annes County, succeeding DR. WILLIAM R. WILLARD,† Hagerstown, Md.

WATSON S. RANKIN, M.D.,* Director of the Hospital and Orphan Sections of the Duke Endowment, Charlotte, N. C., has been elected Chairman of the Charlotte Board of Health.

LEWIS C. ROBBINS, M.D., C.P.H.,† P.A. Surgeon, U. S. Public Health Service Reserve, formerly Health Officer of Wichita Falls, Tex., was presented with the Distinguished Service Award of the United States Junior Chamber of Commerce on January 14. Dr. Robbins was cited for his successful conduct of a venereal disease control campaign that he instituted in Wichita Falls. He is now associated with the Public Health Department in San Antonio, Tex.

FRANCES C. ROTHERT, M.D.,* recently Regional Medical Consultant for the U. S. Children's Bureau in New Orleans, has resigned from the Children's Bureau and has been appointed Acting Director of Maternal and Child Health in the Arkansas State Board of Health, Little Rock.

ELVIN L. SEDERLIN, M.D.,† Bismarck, N. D., has resigned as acting director of the Venereal Disease Control Division of the North Dakota State Health Department in order to accept a position as Assistant Health Director of Baltimore County, Md.

HARRY B. SMITH, M.D., formerly of Jacksonville, Fla., and now field consultant in the Division of Venereal Disease Control in the Maryland State Department of Health, has been appointed senior medical supervisor in the Bureau of Venereal Disease of the Baltimore City Department of Health, Md.

PROFESSOR CLAIR E. TURNER, DR.P.H., Sc.D.,* has been appointed Public Health Education Officer in the Health and Sanitation Division of the Office of the Coördinator of Inter-American Affairs, in which capacity he left for Brazil, Chile and Peru in March.

HERBERT T. WALWORTH, M.S.,* formerly Director of the Division of Industrial Hygiene, Montana Department of Public Health, Helena, Mont., has resigned to become Industrial Engineer of the Tennessee Department of Public Health, Nashville, Tenn.

CHARLES A. WYATT, M.D., Marshall, Tex., has been appointed Health Officer of Harrison County, Tex.

Western States

ALBERT D. BREWER, M.D., has resigned as City-County Health Officer of Bozeman and Gallatin County, Mont., to become staff physician at the Montana State Tuberculosis Sanitarium, Deer Lodge.

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* Fellow A.P.H.A.
† Member A.P.H.A.

WALLACE W. SCHWABLAND, M.D.,† Seattle, Wash., has resigned as Health Officer of King County to enter private practice.

Foreign

PROFESSOR I. G. KLIGLER * was recently honored by the Polish Government in exile with the Polish Golden Cross for Merit in recognition of his services to Polish refugees in supplying typhus vaccine prepared in his department of hygiene of the Hebrew University in Jerusalem.

Death

DANIEL M. MOLLOY, M.D., of White Plains, N. Y., died on January 29.

CONFERENCES AND DATES

American Association of Motor Vehicle Administrators. Chicago, Ill. June 20–23.

American Dietetic Association—27th Annual Meeting. Palmer House, Chicago, Ill. October 25–27.

American Home Economics Association. Stevens Hotel, Chicago, Ill. June 20–23.

American Medical Association. Stevens Hotel, Chicago, Ill. June 12–16.

American Public Health Association—Second Wartime Public Health Conference and 73rd Annual Business Meeting. Hotel Pennsylvania, New York, N. Y. October 3–5.

American Public Works Association. St. Paul, Minn. September 24–27.

American Society of Planning Officials. Chicago, Ill. May 1–3.

American Water Works Association—
Montana Section—Baxter Hotel, Bozeman, Mont. May 5–6.
Southeastern Section — Poinsett Hotel, Greenville, S. C. May 8–10.
New Jersey Section — Trenton, N. J. May 11.
Pacific Northwest Section—Olympian Hotel, Olympia, Wash. May 12–13.
Ohio Section—Hotels Fort Hayes and Chittenden, Columbus, Ohio. May 18–19.
Annual Conference. Municipal Auditorium, Milwaukee, Wis. June 13–16.

Association of Military Surgeons of the United States. Hotel Pennsylvania, New York, N. Y. November 2–4.

Biennial Nursing Convention and Exposition—conducted jointly by the American Nurses Association, National League of Nursing Education, and the National Organization for Public Health Nursing. Buffalo, N. Y. June 5–8.

Canadian Medical Association. Toronto, Canada. May 22–26.

Civil Service Assembly—Western Regional Conference, Los Angeles, Calif. May 22–23. Eastern Regional Conference, New York, N. Y. June 1–2.

Colorado Public Health Association. Denver, Colo. June 7–8.

Idaho Public Health Association. Moscow, Idaho. May 24–25.

Illinois Public Health Association. Chicago, Ill. May 15–16.

Institute of Food Technologists—Fifth Annual Meeting. Edgewater Beach Hotel, Chicago, Ill. May 29–31.

Iowa Public Health Association. Des Moines, Iowa. May 10–11.

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Medical Society of the State of New York. Hotel Pennsylvania, New York, N. Y. May 8–11.

Minnesota State Health Workers. Minneapolis, Minn. May 12–13.

Montana Public Health Association. Helena, Mont. May 19–20.

National Association of Housing Officials—12th Annual Meeting. Chicago, Ill. May 3–4.

National Conference of Social Work. Cleveland, Ohio. May 21–27.

National Fire Protection Association. Philadelphia, Pa. May 8–11.

National Posture Week. May 1–6.

National Probation Association. Hotel Statler, Cleveland, Ohio. May 19–20.

National Restaurant Week. May 8–14.

National Tuberculosis Association. Stevens Hotel, Chicago, Ill. May 10–12.

New Mexico Public Health Association. Raton, N. M. June 9–10.

New York State and Local Committees on Tuberculosis and Public Health of the State Charities Aid Association—Annual Conference. Hotel Commodore, New York, N. Y. May 24–25.

New York State Health Officers and Public Health Nurses Annual Conference. Grand Union Hotel, Saratoga Springs, N. Y. June 27–29.

North Dakota Public Health Workers. Bismarck, N. D. May 19.

Northern California Public Health Association. Sacramento, Calif. May 29–30.

Oregon Public Health Workers. Portland, Ore. May 26–27.

Second War Conference on Industrial Medicine, Hygiene and Nursing. Hotel Jefferson, St. Louis, Mo. May 8–14.

Society of American Bacteriologists. New York, N. Y. May 3–5.

Southern California Public Health Association. Pasadena, Calif. June 1–2.

Utah Public Health Association. Salt Lake City, Utah. June 5–6.

War Conference on Industrial Medicine, Hygiene and Nursing—sponsored jointly by the American Association of Industrial Physicians and Surgeons, American Industrial Hygiene Association, National Conference of Governmental Industrial Hygienists, American Association of Industrial Nurses. Hotel Jefferson, St. Louis, Mo. May 8–14.

Washington Public Health Association. Spokane, Wash. May 23–24.

Western Branch, A.P.H.A.—Business Meeting. Sacramento, Calif. May 29–30.

Wisconsin Public Health Workers. Madison, Wis. May 17.

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